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RELIEF OF SEVERE ANGINA PECTORIS IN YOUNG PEOPLE WITH RHEUMATIC HEART DISEASE*

With Remarks On An Atypical Anginal Syndrome

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IT is our purpose in the present report to call attention to a special group of young people with rheumatic heart disease and disabling angina pectoris who have had a striking relief of pain following sympathetic nerve block. Certain atypical features of the anginal syndrome in this special group resemble closely a syndrome previously observed by others but fully described by Lewis in the St. Cyres Lecture in 1931.[1]

The method employed has been the one originally devised by Mandl[2] and modified by Swetlow[3] whereby painful impulses from the heart and great vessels are blocked by the paravertebral injection with novocain and 95 per cent alcohol of the sympathetic rami communicantes corresponding to the peripheral distribution of the spinal nerves in the painful area. The technique and limitations of the procedure have been fully described recently by one of us (J. C. W.).[4] In general this form of therapy in experienced hands has given satisfactory results. At the Massachusetts General Hospital of thirty-two patients with intractable angina pectoris secondary to arteriosclerotic coronary disease of the heart, the majority (twenty patients) have been completely relieved of pain on the injected side; an additional ten were partially relieved in that their angina has been reduced from a severe form to mild and infrequent attacks easily controlled by nitroglycerin. Only two failed to secure relief and these occurred in the first half of the series. Furthermore, we have had successful results in three additional patients with cardiovascular lues and intolerable pain secondary to an expanding aneurysm of the aortic arch. There remains, however, in addition to the incompletely relieved instances, a further limitation to the method; namely, the frequent and at times troublesome but temporary complication of postoperative intercostal neuralgia. Rarely (in three cases) this neuralgic pain has been severe and equal to the pain of angina pectoris for which the procedure was undertaken.

In contrast to these limitations which have been encountered in the arteriosclerotic group of patients, our experience with this form of therapy in a small series of young people with angina pectoris secondary to rheumatic heart disease has emphasized two important features; the relief of the anginal pain in the area supplied by the injected nerves has been uniformly successful, and there has been an absence of postoperative intercostal neuralgia. Their case histories are briefly summarized in this report. They reveal atypical features of the anginal syndrome characteristic of this special group and emphasize the rôle of active rheumatism as an important precipitating factor.

CASE REPORTS

CASE 1. (H. G. S. No. 6075.) C. J., a boy seventeen years of age, was under observation from 1930 to a few weeks before his death in 1935. He had severe rheumatic heart disease with marked cardiac enlargement, free aortic regurgitation with a blood pressure of 150 mm. of mercury systolic and 30 mm. of mercury diastolic, mitral regurgitation and stenosis, and angina pectoris decubitus. Rheumatic fever began in 1929 at the age of eleven, and except for brief intervals of one to two months at home or in foster homes, the remainder of his six years of life was spent in hospitals. His illness was characterized throughout by persistently active rheumatic disease with frequent severe exacerbations. In January, 1934, after a number of weeks of aching precordial pain and during an exacerbation of rheumatic fever, he began to have unusual attacks of angina pectoris. The most severe attacks occurred at night. To Dr. B. F. Massell, the resident physician, we are largely indebted for the blood pressure determinations during the severe nocturnal episodes. The patient was usually awakened in the early morning by a sense of smothering and constriction across the chest and thumping of his heart. The rate was usually 120 to 140 per minute during such attacks. As the heart action became more forceful the oppression increased and was in large measure replaced by severe precordial pain which spread transversely to both sides of the sternum and up the left side of the neck as far as the occipital region. In later attacks there was radiation down the inner aspects of both arms as far as the elbows, and rarely to the wrists. During the attack the patient appeared to hold his breath in fear of pain; when he breathed there was no true dyspnea during the earlier episodes. Later, however, dyspnea was a troublesome feature and

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pulmonary edema occurred toward the end of several of the severe attacks. There was a generalized flushing of the skin and profuse sweating. The blood pressure was repeatedly observed at the height of an attack to be from 250 to 300 mm. of mercury systolic and the diastolic level, although unattainable with any degree of accuracy, appeared to be in the vicinity of 10 to 20 mm. Diffuse abdominal pain, at times severe and maximal across the upper abdomen, was a frequent accompaniment. Nitroglycerin gave relief of the chest pain during the milder attacks, but with the severe episodes the relief was so transient that morphia was usually required. Because of increasing severity and frequency of the attacks the first four thoracic sympathetic rami communicantes of the left side were injected with alcohol in April, 1935. A well-marked Horner's syndrome together with the peripheral vascular signs of sympathetic nerve block resulted. A small and transient pneumothorax at the left apex and pleural pain for a few hours were the only complications. There was complete and permanent relief of the left-sided chest pain which had previously been maximal in the precordial region. During frequent subsequent attacks severe right-sided pain associated with minimal discomfort in the left neck and below the lower left costal margin persisted. The milder episodes continued to be relieved by nitroglycerin, but because of the continued severity of symptoms the upper four sympathetic rami on the right side were injected similarly in May, 1935. This was followed by relief of the right-sided discomfort. The paroxysmal circulatory phenomena and the discomfort in the left side of the neck continued, but the important element of fear of an impending attack had been dispelled. With subsequent improvement in his general condition during the next three months he was able to be up and around the house with only occasional anginal attacks largely related to excitement or exertion, and manifested by minimal discomfort in the left side of his neck, and palpitation. The neck pain promptly responded to nitroglycerin. The patient died in November, 1935 several days after the onset of a severe recrudescence of rheumatic fever and seven months after the alcohol injections. His terminal symptoms were those of severe abdominal pain and dyspnea associated with congestive failure. The autopsy showed chronic rheumatic heart disease with gross scarring and deformity of the aortic, mitral and tricuspid valves, together with a thick and adherent pericardium. The heart weighed 1120 grams. The coronary arteries were widely patent throughout. The relief of the intractable pain of angina pectoris in this patient had been complete in the distribution of the nerves injected except for minimal discomfort in the left side of his neck. This residual pain was consistent with x-ray evidence after lipiodol injection that the first thoracic nerve root on this side had been incompletely injected. Although the associated circulatory disturbances were apparently unaffected by the procedure, the relief of pain and the elimination of fear not only contributed considerably to his comfort, but also may have been an important factor in his subsequent temporary improvement.

CASE 2. (H. G. S. No. 3942.) E. C., a female twenty-six years of age, has been under observation since 1925. She has rheumatic heart disease with marked cardiac enlargement, free aortic regurgitation with a blood pressure of 170 mm. of mercury systolic and 50 mm. diastolic, mitral stenosis and regurgitation, and angina pectoris decubitus. Severe rheumatic fever and heart disease began at the age of nine years. A recrudescence of rheumatic fever occurred at the age of sixteen requiring hospitalization for twelve months. She subsequently did well and remained free of symptoms except for moderate exertional dyspnea and palpitation until December, 1933 when, at the age of twenty-six, she re-entered the hospital with another recrudescence of rheumatic fever. While at rest in bed she began to have severe angina pectoris. Her attacks were characterized by paroxysmal discomfort due both to pain and to associated circulatory phenomena. The sequence of events began with consciousness of forceful regular heart action and a sense of throbbing in the throat accompanied by an increase in the pulse rate from a resting level of 90 up to 130 to 140 per minute. In one to two minutes an aching precordial pain appeared, rapidly becoming severe and spreading upward in the chest and down the left arm as far as the wrist. Respiratory discomfort and a sense of choking were usually present as well as profuse sweating and generalized flushing of the skin. A blood pressure determination was not made during an attack. Occasionally dyspnea and palpitation occurred without pain, but never the reverse. Although precipitated by emotion or exertion, the attacks most frequently occurred without provocation especially during the night. The severe anginal pain was usually superimposed upon a less intense precordial aching sensation similar to that frequently described by patients during active rheumatic fever. Nitroglycerin gave partial relief, but it was this latter component of the patient's discomfort which remained uninfluenced by the drug and for which morphia was required frequently. In May 1934 the first four thoracic sympathetic rami communicantes on the left side were injected with alcohol. There resulted a well-marked Horner's syndrome, a transient partial anesthesia over the left chest anteriorly, and a variable paresthesia over the left upper back and down the inner aspect of the left arm. This was followed by complete relief from the anginal pain during frequent subsequent attacks, the presence of which was made known by a tightening sensation in the throat and a persistence of the accompanying palpitation, respiratory discomfort, and generalized flushing of the skin. However, as with the previous patient, another important element in addition to the pain had been dispelled; namely, the fear of an impending attack. It is of considerable interest that the precordial ache which previously had not responded to nitroglycerin, persisted off and on in a modified form but on the whole was less severe and less frequent. This component appeared to be directly related to the active rheumatic disease and subsequently entirely disappeared. The patient has been seen at frequent intervals and was last examined in June 1936 two years after the injection. She is in good condition and is free of clinical and laboratory evidence of active rheumatic infection. There remains a slight residual Horner's syndrome and a vague sense of numbness to touch over the precordial area with slight paresthesia along the inner aspect of the left upper arm. She leads a quiet life and is able to do light household work. About once a week she has to pause for a few minutes because of tightening in the throat and thumping of her heart, but now always related to unusual exertion or excitement.

CASE 3. (M. G. H. No. 342782.) M. S., a female thirty-seven years of age, was seen for the first time in the Cardiac Clinic in July, 1934. She had severe rheumatic heart disease and marked cardiac enlargement, free aortic regurgitation with a blood pressure of 170 mm. of mercury systolic and 40 mm. diastolic, mitral regurgitation and stenosis, and

severe angina pectoris decubitus. She had had her initial attack of rheumatic fever at the age of twenty-eight years and rheumatic heart disease was noted thereafter. Frequent respiratory infections in 1930 were followed by a recrudescence of rheumatic fever and she was confined to her bed for six months. During this time there was considerable aching precordial pain which she thought was pleurisy. Toward the end of this illness she began to have angina pectoris. The pain was severe, paroxysmal in nature, and, although precipitated promptly by exertion or excitement, it occurred most often without provocation and especially at night. It began substernally and in the precordium, spread transversely and radiated through to the back, to the neck, and down both arms. It usually subsided in five to ten minutes but at times lasted as long as an hour. Nitroglycerin and amyl nitrite gave relief of the pain, but not of the associated discomfort of palpitation, respiratory distress, and profuse sweating. The recumbent position appeared to be a predisposing factor and she found that by sleeping on three pillows the episodes of pain and dyspnea were less frequent.

She entered the hospital in January, 1935, and alcohol was injected about the first four thoracic sympathetic rami on the left side. A well-defined Horner's syndrome and the peripheral signs of sympathetic nerve block followed. A slight left-sided pleurisy subsided in a few days and no intercostal neuralgia appeared subsequently. The angina pectoris was completely and permanently relieved over the left side of the chest, but slight pain persisted in the vicinity of the left elbow and has since involved a somewhat greater extent of the arm. Here, as in case 1, lipiodol injected through the highest needles showed a poor infiltration of the tissue around the first thoracic ganglion. She continued to have frequent attacks of severe right-sided angina pectoris with minimal pain near the left elbow. An injection of the first four rami on the right side as well as further injection of the first ramus on the left (for the arm discomfort) was considered but, with subsequent improvement in her general condition and subsidence of active rheumatic disease during the next three months, her attacks of right-sided pain became much less frequent. They are now directly dependent upon unusual exertion or excitement and nitroglycerin gives prompt relief. She leads a quiet life comfortably and was last seen in June, 1935. The excitement of a clinic visit precipitated a moderately severe attack of right-sided angina pectoris while being examined. Nitroglycerin relieved her promptly. The heart rate increased during this episode from a resting level of 80 per minute to 120 during the height of the pain, and returned slowly in the course of ten minutes to a rate of 85. Further injection has been postponed for the present. We believe, however, that interruption of the sympathetic pathways on the right side may be necessary later if she has a recrudescence of active rheumatic disease.

CASE 4. (B. M. No. 20842.) H. C., a man thirty-five years of age, was seen by us for the first time in November, 1935. He had extensive rheumatic heart disease with marked enlargement, free aortic regurgitation with a blood pressure of 170 mm. of mercury systolic and 60 mm. diastolic, and apical systolic and diastolic murmurs suggesting mitral valve involvement. At postmortem examination later the mitral cusps were found to be normal. Frequent physical examinations had revealed no evidence of heart disease prior to the onset of rheumatic fever at the age of thirty-one years in 1931. Heart disease was found shortly thereafter. The subsequent course indicates that rheumatic infection probably persisted for the remaining four years of his life manifested clinically by poor health, progressive weight loss, low-grade joint pains (at times more pronounced), and progressively increasing cardiac symptoms of palpitation and breathlessness. In 1932 and one year after the onset of rheumatic fever he began to have clear-cut attacks of angina pectoris both on exertion and at rest. The majority occurred at night. The attacks increased in frequency and severity and during the year prior to hospital entry he had been compelled to lead a bed and chair existence. Often there were as many as twenty to thirty anginal attacks during the course of twenty-four hours. They were characterized by intense precordial and substernal pain chiefly on the left side, spreading up the neck as far as the jaw and down the left arm to the wrist. Rarely he had felt slight pain in the right arm with unusually severe attacks. Here again there were accompanying circulatory phenomena of tachycardia, palpitation, respiratory discomfort, generalized flushing of the skin, and profuse sweating. Nitroglycerin under the tongue relieved the pain and he often used as many as fifty pills in twenty-four hours. Grumbling joint pains, pallor, and obvious weight loss, as well as a leukocytosis and an elevated (corrected) sedimentation index indicated a persistently active rheumatic infection when he entered the hospital. This was further supported by the finding of a P-R interval of .20 to .21 seconds by electrocardiogram. Left bundle branch block was also present.

Alcohol injection of the first four thoracic sympathetic rami on the left side resulted in the usual peripheral signs of sympathetic nerve block and complete relief of the painful component of his attacks. Their occurrence, however, continued with undiminished frequency as indicated by a sense of tightening in the throat and the uncomfortable circulatory phenomena. A left-sided pleurisy due to irritation of the adjacent pleura lasted several days, but caused no great difficulty. The patient died unexpectedly in bed while talking to a nurse ten days after the injection. The heart at postmortem examination weighed 800 grams. There was slight scarring and moderate insufficiency of the aortic valve cusps. The mitral leaflets appeared to be normal. At the base of the aorta there was an active endarteritis which on gross examination suggested a luetic process, but histologically the type of reaction more closely resembled that occasionally observed in the aorta with severe rheumatic infection. This interpretation was further supported by a negative serology (Hinton reaction) and the absence of clinical evidence of lues. The mouth of the right coronary artery was slightly narrowed, but beyond their mouths both main coronaries and all their major branches were entirely normal.* No adequate cause for the sudden exitus was found. There had been a striking and complete relief of the severe anginal pain in this patient following left-sided sympathetic nerve block. The discomfort dependent upon the associated circulatory disturbances remained unaltered.

DISCUSSION

Paravertebral alcohol injection of the thoracic sympathetic rami communicantes has been followed by unusually satisfactory results in this small group of four young patients with severe

*A further clinical and pathological discussion of this unusual case may be found in the "Case Records of the Massachusetts General Hospital, Case 22141." New Eng. J. Med. 214:690 (April 2) 1936.

rheumatic heart disease and disabling angina pectoris. The pain was successfully relieved in the area supplied by the peripheral distribution of the injected nerves. In Case 1 the persistence of modified pain in the left side of the neck indicated incomplete destruction of the first thoracic ramus, and in Case 3 minimal pain in the region of the left elbow likewise pointed to a partially inadequate injection of the first ramus. Subsequent improvement in these patients, however, made further injection unnecessary. Furthermore, postoperative neuralgia which at times is a troublesome complication in the older patients has been entirely absent. The exact explanation of this favorable feature is not clear. Further experience may show that it was merely a fortunate coincidence, but certainly the slender physique and the thin chest wall in these young patients favor a more accurate injection than is possible in the older group where a barrel-shaped chest and obesity frequently render the procedure technically difficult.

Certain clinical features have been characteristic of the atypical anginal syndrome in this special group of young people. Free aortic regurgitation and a low diastolic pressure were present in each instance. In the two fatal cases the coronary arteries were widely patent throughout, although in one instance the right coronary artery was partially encroached upon by an active endarteritis at the base of the aorta. In each of our patients the pain has been intense, paroxysmal in nature, and has had the same distribution as angina pectoris associated with coronary heart disease. A characteristic feature has been the frequency of attacks without provocation. The most severe have occurred at night and the recumbent position appears to be a predisposing factor. The associated circulatory phenomena of tachycardia, palpitation, generalized flushing of the skin, profuse sweating, and difficult respiration are essential features of the attack. They usually precede the appearance of pain and occasionally in the milder episodes occur without the painful component. The pain, on the other hand, has not been observed in the absence of the circulatory disturbances. In Case 1 the associated respiratory discomfort was intense and at times pulmonary edema ensued. It is evident that the subjective and objective features of the attacks constitute a remarkably consistent clinical picture. Lewis studied episodes in a comparable group of four patients and pointed out an interesting relationship between the elevated systolic level of blood pressure preceding the onset of pain in his patients and the favorable influence of amyl nitrite on the pain before the blood pressure had been significantly altered. So constant were the clinical features in his patients that Lewis believed them to represent a special type of angina pectoris. With this view we are in agreement. There remains, however, an important factor not previously commented upon which may be in part responsible for the atypical features of the syndrome. At least in our group the presence of clinically active rheumatic infection has not only clearly initiated the appearance of the anginal syndrome but also has increased the frequency and severity of the attacks. Furthermore, with subsequent quiescence of the rheumatic disease the attacks of pain have reverted to a more typical form of angina pectoris in their direct dependence upon unusual exertion or excitement as precipitating factors. In further support of the probable important rôle that active disease plays is a second well-recognized group with so-called atypical angina pectoris in patients with cardiovascular lues and free aortic regurgitation (Case 1 of Lewis's series). In these patients, nocturnal episodes of angina pectoris without provocation and frequently associated with cardiac asthma often respond promptly to specific antiluetic therapy.

It is evident then that there does exist in the presence of free aortic regurgitation and occasionally in relatively young people a characteristic but atypical syndrome of angina pectoris accompanied by important circulatory disturbances. It is probable that coronary insufficiency of an order to produce pain in these patients is dependent upon a combination of factors. White and Mudd[5] have emphasized the uniform finding of free aortic regurgitation in this younger group. There are, however, a few authentic cases of angina pectoris in young rheumatic patients with mitral valve disease without aortic regurgitation. Lewis[1] has suggested coronary spasm associated with an unusual and temporary elevation of blood pressure as a possible factor in the production of pain in the patients he studied. A further interesting feature has been the associated tachycardia preceding the appearance of pain. That this may be an additional factor contributing to an insufficient coronary blood supply is suggested by the observations of White and Camp[6] on the status anginosus induced by paroxysmal auricular fibrillation and paroxysmal tachycardia in older patients with coronary heart disease. Finally, the clinical course of our patients emphasizes the importance of active cardiovascular disease, either of rheumatic or luetic nature, as an additional and probably essential feature of the syndrome.

SUMMARY

1. Relatively young people with severe angina pectoris complicating rheumatic heart disease appear to be an unusually suitable group for

the relief of pain by paravertebral alcohol injection of the thoracic sympathetic rami communicantes.

2. Postoperative neuralgia has not occurred in our series of four cases.

3. Attention is called to the probable importance of active cardiovascular disease, either luetic or rheumatic, as an essential feature of atypical angina pectoris in young people with free aortic regurgitation.

REFERENCES

1. Lewis, T.: Angina pectoris associated with high blood pressure and its relief by amyl nitrite; with a note on Nothnagel's syndrome. Heart. **15**:359 (July) 1931.
2. Mandl, F.: Weitere Erfahrungen mit der paravertebralen Injektion bei der Angina pectoris. Wien. klin. Wchnschr. **38**:759 (July 2) 1925.
3. Swetlow, G. I.: Alcoholic injections into nerve tissues for the relief of pain. Am. J. M. Sc. **171**:397, 1926.
4. White, J. C.: The Autonomic Nervous System. New York, Macmillan Co., 1935.
5. White, P. D., and Mudd, S. G.: Angina pectoris in young people. Am. Heart J. **3**:1 (Oct.) 1927.
6. White, P. D., and Camp, P. D.: The status anginosus induced by paroxysmal auricular fibrillation and paroxysmal tachycardia. Am. Heart J. **7**:581, 1931-32.

SILICOSIS

BY JOHN B. HAWES, 2ND, M.D.*

VERY few physicians are aware of the extent to which claims for alleged injury and disease due to dust are being brought before courts and industrial accident boards in this country. The situation in this regard amounts to a "racket" compared with which others, notorious in New York, Chicago and elsewhere, fade into insignificance. Unscrupulous lawyers have their "runners" on the lookout for any employee who is exposed to dust in the course of his work, no matter what the nature of the dust nor however harmless it may be, who happens to come down with a cough or a cold or indeed with almost any other illness and then and there try to persuade him to bring suit. Unfortunately, in too many instances, physicians partly through ignorance and partly through an honest desire to help their patients and perhaps on the general theory of "soaking the insurance company" are willing to testify that the dust to which this individual had been exposed was entirely responsible for his condition. In nearly 100 per cent of such cases the doctor takes at its face value the word of the worker and his friends as to the dust hazard without any real knowledge of the situation obtained from a personal inspection of the plant or at least by interviewing those in a position to know.

Within the past year, for instance, an extremely high-grade general practitioner in this state testified under oath that the tuberculosis from which a certain man suffered was associated with and due to a pneumoconiosis contracted from his exposure to dust in a certain woolen mill. Aside from the fact that the organic dusts do not cause pneumoconiosis and are quite harmless, I had previously inspected this particular mill and seen the exact work this man was doing and had first-hand information as to the extremely high-grade working conditions in this particular plant. Recently I was requested to examine a certain young man of twenty-one who was a patient at a sanatorium in Massachusetts. He had been a cloth cutter for some years. He had a moderate amount of tuberculosis which was doing very well indeed but he put in a claim before the Industrial Accident Board of this state on the grounds that it was the dust involved in cutting cotton cloth with scissors and a machine which had led to the reactivation of his disease. He was encouraged in this belief by his own physician who had given his opinion definitely in writing to this effect. I examined the premises where he had worked which I found to be ideal in every possible way, being as a matter of fact one of the activities of a prominent and highly respected Boston charity for the handicapped. Not only is cotton dust perfectly innocuous, so far as the lungs and tuberculosis are concerned, but also the conditions under which this man worked were so extraordinarily good that any possible injury to the patient from this source was out of the question.

Perhaps one of the most striking examples of this is now being argued in one of the very large industries of this country, the plants of which in Massachusetts I have personally inspected. Here certain workers are exposed to:

1. Minute quantities of iron or steel rust, which is harmless;
2. Equally microscopic amounts of lime equally innocuous;
3. An almost infinitesimal amount of a silicate, less than 1 per cent, found as an impurity of the lime; and
4. Small amounts of powdered soap used as a lubricant.

Each and every one of these ingredients is absolutely harmless in the minimum amounts to which the workman was exposed. As I mentioned above, I have gone through several of the plants where this work was being done and have stood by the workers and seen each and every operation. And yet, allegedly reputable physicians have testified in the cases that have so far come to trial that this dust as described above had caused pneumoconiosis to develop and was responsible for the workman's tuberculosis,

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bronchiectasis, heart failure or whatever the plaintiff happened to claim in spite of autopsy findings ruling out any dust disease! Truly a deplorable and almost shocking state of affairs!

I feel very strongly, therefore, that general practitioners and particularly those specializing in diseases of the lungs and tuberculosis might well familiarize themselves with this general subject of silicosis and acquire accurate knowledge concerning those dusts that are harmful and those that are not. Hence this article.

The dangerous dusts are those that contain silicon in some form. All organic dusts—flour, tobacco, cotton, wool, wood, etc.—and all non-silicon-containing dusts such as carbon, coal, iron, lime, marble, etc., are considered to be and are harmless. This statement needs little or no qualification. Workers in coal mines get anthracosis, it is true, but it does them no harm and does not render them susceptible to tuberculosis. If they contract silicosis it is because of the granite or some other silicon-bearing rock in which the coal is imbedded. I remember a man who fell down a chute in a lumber mill and was buried for an hour or so in a pile of sawdust from which he was taken out unconscious. He developed bronchiectasis but this does not prove that the ordinary wood dust to which a man using a turning lathe is exposed is in any way harmful. One of the most extreme cases of silicosis I ever saw was in a man working in a chocolate factory! Upon investigation I found that his job for years had been to "re-surface" the granite millstones used to grind the cocoa bean. Hence his silicosis. Another man with definite and marked silicosis worked in a carpet factory. I was greatly puzzled as to how he acquired his undoubted silicotic disease until I inspected the plant. Here in a very large room were many bales of wool coming from Egypt or some other foreign source. This man's job was to open these bales, sort and spread out the wool and put it in big armfuls down a chute for the next process. It was evident that he came into close and intimate contact with the raw material. On the floor of this room there was one-eighth to one-quarter inch of dry brownish sand. Hence this man's silicosis.

Again, Dr. M. J. Stone and I recently came across two men with undoubted silicosis, each a worker in the garment trade, surely a harmless enough occupation as far as silicosis is concerned. On careful inquiry I found that each of these men had worked in a porcelain factory in Russia fifteen and eighteen years ago respectively which of course explained the silicosis.

Granted, then, that the dangerous dusts are only those which contain silicon in some form, in what form does this danger consist? It may be stated as follows:

(1) The form of silicon which is present. Silicon dioxide in crystalline form as found in quartz, granite, sand and in certain other minerals, is considered to be the chief and primary factor in causing damage to the lungs in the way of silicosis. The silicates as a whole are considered comparatively harmless. The majority of authorities in this country are firmly of this belief. To this there is one exception, namely, asbestos, which is an aluminum and magnesium silicate, the exact ingredients depending upon where the asbestos is mined. This for some reason not as yet known but probably at least partly due to its fibrous nature is one of the most dangerous of all dusts. The other silicates such as those found in talc, cement and certain minerals are comparatively harmless unless the concentration is very high indeed and the exposure an extremely long one.

(2) Length of exposure. Ten to twelve years is the average minimal time in which a normal granite cutter will contract definite, diagnosable and disabling silicosis.

(3) Intensity of exposure. A man working in dust which contains only 5 per cent to 10 per cent of free silica will take a much longer time to develop clinical disease than if the concentration were higher.

(4) The size of the dust particles. Particles of dust, ten microns or over, do not enter the finer parts of the lung and are taken care of by the normal dust-removing apparatus. The dangerous particles are those, five microns or less in size, the danger increasing inversely with the size.

(5) The fifth factor consists of that unknown equation, the resistance of the individual. Just as certain individuals have no resistance to tuberculosis and others have it to an enormous degree, so undoubtedly there are men and women who can stand large amounts of harmful dusts for many years and others who will break down in a comparatively short while.

(6) Pre-existing disease. The final factor which must always be given serious consideration is whether there is any handicap already existing in the way of disease of the heart and particularly of the lungs such as tuberculosis. It is well to remember that 75 per cent of all granite workers, for instance, die of tuberculosis and that 89 per cent of the workers in the mines of South Africa die of this disease.

The diagnosis of silicosis at the present time is far too often left to the roentgenologists who are too prone to make definite statements as to the presence or absence of silicosis from the appearance of the x-ray plate alone. In this condition the diagnosis depends upon the following:

(1) *History:* Has the patient been exposed

to dust of any kind and is this dust one of the dangerous variety? Here I would urge again that physicians examining such cases in which they may be called upon to testify in court or before the Industrial Accident Board do not take the patient's word altogether but confirm his statements, if possible, by seeing the working conditions for themselves or at least by talking with someone who can speak with authority on this subject.

(2) The *patient's symptoms:* In early cases, just as in tuberculosis, symptoms may be conspicuous by their absence. In well-marked cases of silicosis, however, shortness of breath on the slightest exertion is by all means the most striking symptom. Loss of weight and strength are not by any means common. There may be and often is a dry, harassing cough but this, too, is often absent. Fever, pain, night sweats, raising of sputum and blood spitting are rare, and if present, are generally due to an associated tuberculosis.

(3) *Physical examination:* This may reveal very little. Markedly limited chest expansion is striking and of great importance. A general appearance of robust health with good color is the rule rather than the reverse but if the individual is put through any sort of a test such as walking rapidly or deep breathing manifest dyspnea will be evident.

(4) *X-ray:* The x-ray in advanced cases is of the greatest importance and in itself may be diagnostic. The x-ray in the early stages may show very little. In a marked case of silicosis diffuse granular mottling beginning around the root of the lung and the middle one-third, extending then to the bases and last to the apices, gives a striking picture. Differential diagnosis must be made between a miliary tuberculosis which is usually not difficult except in chronic cases, miliary carcinomatosis, which is rare, and finally, one of the various yeast infections which are not so uncommon as we have been accustomed to believe. Such conditions may be extremely difficult to differentiate from silicosis by the x-ray alone.

Treatment of this condition is of little or no avail. The individual of course should be removed from his dusty occupation and should live within his limitations. The disease is a progressive one although symptoms may lie in abeyance for years and then suddenly crop out, sometimes following an acute respiratory tract infection such as pneumonia, influenza or an acute bronchitis. As stated before, silicosis reduces the resistance to tuberculosis to a tremendous extent and likewise to other respiratory diseases, particularly pneumonia. If the patient does not die of tuberculosis or pneumonia his heart and circulatory apparatus will eventually give way owing to the increasing burden put upon them through the formation of fibrous tissue.

Twenty or twenty-five years ago "granite cutters' disease" and similar conditions were supposed to be a form of tuberculosis. Even at the present time certain prominent French observers refuse to admit that silicosis exists as a clinical entity but maintain stoutly that it is a form of tuberculosis, which theory is of course no longer accepted in this country. As recently as the past decade, however, most of us were of the opinion that the damage done by the particles of granite, for instance, was due to a mechanical process; we felt that each particle of dust, then thought to be insoluble, acted as a foreign body in the lungs and eventually became surrounded by a mass of scar tissue which tended slowly to increase with the natural consequences. Now, however, thanks to the work of Gardner and Cummings at Saranac, Lanza in New York and those connected with the U. S. Public Health Service and others, we know that silicon acts as a slow tissue poison and is slowly dissolved by the body fluids and excreted through the kidneys and in other ways and that it is the reaction to this poison that results in the formation of fibrous tissue.

It is well to bear in mind in this discussion that silicon is found normally in the human body and that it is present in practically all of the dust which we breathe but it is only when it exists in excessive amounts and in the form of crystalline silicon oxide that it becomes dangerous to health. Exposure to small amounts of silicon in the form of tale, for instance, which is the chief ingredient of dusting powders, etc., is perfectly harmless while minute quantities of silicon found as an impurity in other substances are equally innocuous.

The treatment of this disease is of course in prevention. This means:

(1) Examination with an x-ray of all employees prior to entering a dusty trade;
(2) Periodic examinations of employees so exposed;
(3) Rotation in services as, for instance, changing the sandblaster every few months to another occupation;
(4) Efficient dust-removal apparatus and really efficient respirators in the extremely dusty occupations such as sandblasting.

If such measures as these were efficiently carried out, the tremendous death toll due to silicosis would become a thing of the past.

PSYCHOBIOLOGY IN GENERAL MEDICINE*

BY KENNETH J. TILLOTSON, M.D.†

MODERN psychiatry has become an important and integral part of general medical thought and practice. In this new relationship, that is, the collaboration between psychiatrists and all other departments of medicine, psychiatry has gained much and at the same time has contributed a great deal to the study and consideration of patients from the standpoint of the patient-as-a-whole, or as a psychobiological unit.

Since all medicine today is in part an applied science and since the principles of psychobiology are essentially scientific, the particular psychiatric approach that embraces these concepts of psychobiology goes farther than previous theories in psychiatry both in scope and from a scientific standpoint. Psychiatry has been considered a specialty and no doubt it has been regarded in the past by most physicians as an isolated one. It has also been criticized as unscientific or weak in its scientific formulations. It has been regarded as difficult to understand by a large group of practicing physicians. It is the opinion of the writer that much of the static psychiatry of Kraepelin, like many of the academic psychologies, fulfills a useful purpose and is still important to the psychiatrist, but falls far short of offering to the clinician a point of view and a method of dealing with his daily problems, in a practical, helpful, or commonsense manner. The interpretive and mechanistic theories of Bleuler, together with the contributions of Jung, and Freud, dealing as they do with the unconscious motivations or with the rôle of the unconscious mental mechanisms in producing symptoms, have added much to our knowledge as psychiatrists and to the knowledge of the average physician. The psychobiological concepts and theories of Meyer, have, however, utilized and crystallized the foregoing ideas in a workable manner so that the "workings" (ergasias) of the individual patient may be more intelligently approached and understood not only by the psychiatrist but by every physician who is called upon to treat a patient. While psychiatry is regarded as a specialty in medicine, it can no longer be considered as either a narrow or an isolated subject. A little reflection and consideration cannot but convince anyone of its broad scope and far-reaching importance. So many illnesses beginning as diseases or strictly problems of internal medicine or surgery, pediatries or obstetries, and so forth soon overflow into the field of psychiatry and vice versa. One need but mention the deliria of typhoid fever and pneumonia and many other infectious diseases as well as the mental states associated with lead and other industrial toxins, the various mental symptoms accompanying alcoholism, tertiary syphilis, encephalitis, multiple sclerosis, the anemias, diabetes, arteriosclerosis, senility and the effects of all endocrine disorders on the functions of the mind or mentation, but even all this is but a small part of the many reasons why every physician should cultivate that attitude which comes from a better knowledge of psychiatry or what might be termed the psychobiological viewpoint which is by no means a narrow or a one-sided viewpoint.

Psychobiology is in reality a study of the patient as a whole. It utilizes all of our contemporary psychiatric knowledge as well as our general medical knowledge. It by no means ignores the constitutional background and personality characterizations of the patient and even includes the genetic factors and the sociological factors. It gives to every physician methods of treating not only the physical symptoms of the patient but the patient's complaints. The complaint problem of the patient is the basis of approach in any medical work. This is particularly true in the psychobiological approach to the patient. To be sure, the patient's whims or peculiarities and eccentricities, his particular personality characterizations are reflected in the complaint problem and are therefore taken into account in this psychobiological study and investigation which leads us to an evaluation in every clinical picture of the influence of all factors in the function of the patient as a whole. The patient is thought of, therefore, as a psychobiological unit and the study is a psychosomatic one. The mind and disturbances of mind function or mentation are not detached from the usual clinical symptoms elicited in the general medical patients. The usual causal studies and diagnostic procedures and their results are supplemented by a personality study and a review of a biographic type which reveals the patient's personality development and characterizations, the important social problems and the emotional problems and their relationship to physical symptoms or to the complaint problems as formulated by our patient. Mental symptoms and reactions are not separate in their genesis and development from physical symptoms and vice versa. Every patient is an "experiment in nature" and psy-

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chiatry simply carries this theorem into practice and a patient in the general hospital or in the psychiatric clinic and hospital or in the gastrointestinal clinic is in every case a psychosomatic study.

This leads to the treatment of all patients with a broader and most inclusive point of view on an entirely nonprejudicial basis. Mental reactions, emotional symptoms and physical symptoms are so closely integrated in any concept that leads to a consideration of the patient as a whole that no treatment is complete or successful that is not based on such a psychobiological approach and study.

It is with the foregoing in mind that the writer has approached the clinical work and practice of psychiatry in the different departments of the Massachusetts General Hospital during the past five years. The scientific value as well as the clinical assistance rendered in such collaboration to both internists and surgeons and psychiatrists is dependent upon a mutual understanding of the total clinical picture and of all of the factors involved. Psychobiology formulates these factors in a more understandable manner for the clinician.

During the past year the writer has been working in the gastrointestinal outpatient department clinic of the Massachusetts General Hospital in addition to the routine consultation and psychiatric teaching work that he has made in the psychiatric study of medical and surgical patients. This particular investigation of a very interesting group of patients with known organic disease and pathology in the gastrointestinal tract, that is, with known gastric ulcer, duodenal ulcer, hypertrophic gastritis and colitis, and so forth is being made in collaboration with the internists and surgeons in order to give the emotional factors proper evaluation. This investigation of any underlying or accompanying emotional factors to be considered in the medical and surgical treatment of the foregoing group in order properly to evaluate physical and organic symptoms as well as the personality factors and the emotional components must be considered in the successful study and treatment of the patient. This constitutes actually a psychobiological approach into the total functions or workings of the individual as a whole. This leads to a better formulation of the factors involved and to the selection of the proper type of psychotherapy to be utilized in the treatment of the same.

Psychotherapy, generally speaking, has been found helpful in the majority of these patients who have been worked with in the gastrointestinal clinic even in the presence of organic disease as above specified and often in spite of surgical repair that has in some cases taken place.

Another question of outstanding importance is that of the relation at the psychological level of the physician to his patient with the understanding and the acknowledgment of the fact which rarely seems to be mentioned that the experimenter or the physician in every such position is part and parcel of the problem which he is undertaking to solve. This has properly been given a scientific sociological evaluation by Henderson in his article "Physician and Patient as a Social System." What has just been said concerning psychotherapy is only a special case of the broad principle that in all of man's efforts to explain and understand himself he cannot objectify his problems in accordance with the demands of the physical sciences. He is a part of what he is trying to explain, a fact that those same physical sciences are taking more serious thought of at the present time and this must be continued in the future. This fact makes all contributions in the field of psychotherapy peculiarly subject to artefacts and peculiarly difficult. This emphasizes, however, the importance of a psychiatric viewpoint in general medical practice.

In many instances the emotional factors seem to be developed as an accompaniment or following the organic symptoms such for instance as hemorrhage or operation or pain with definite pathology. In other instances the emotional factors, the difficulties in adjustment, the inability to resolve the task of life, the personality characterizations were well marked for such a long time before the gastrointestinal disease manifested itself that the relationship between the emotional factors and the subsequent development of organic pathology is most striking. Psychotherapy is used of course by all physicians in various forms and in varying degrees. Its value and application no doubt have been emphasized and developed by the psychiatrist. There has been the practical problem of how general hospital patients should receive such psychotherapy of a more special type in case it was advised. This problem is very much aided by having psychiatrists in the general hospital giving regular amounts of time to consultation work and to special clinics. The problem of psychosomatic interrelations is continually a stumbling block to the specialist in many phases of scientific research or personality study. One of the important ways of overcoming these difficulties seems to be at the bedside of the patient or in a collaborative study of patients in the outpatient clinic or in the various departments of the general hospital. We have reached a point where progress in the specialties themselves has been blocked by a lack of understanding of the relationships between them. Scientists commenting on the tremendous gain which has accrued to us during the last decades of specialization are calling attention to the fact that many of the most vital of our problems lie between the sciences and cannot be

even preserved without going beyond the confines of a specialty. Recently Dr. H. Flanders Dunbar has emphasized the interrelations of emotional and physical reactions or symptoms. From the chapter dealing with gastrointestinal system in her book entitled, "Emotions and Bodily Changes" she writes as follows: "The folk mind, through language itself called attention to the psychological significance of the gastrointestinal tract. As a matter of fact this tract is one of the first organ systems in relation to which the significance of psychic factors in illness was brought home to physicians."

R. Schindler in 1928 writes, "Psychoneurosis of the gastrointestinal tract is caused by disturbances of its organ function as a result of participation of psychic factors with the absence of anatomical changes. How do they develop?" The significance of the conditioned reflex (Pavlov and Von Bergmann) is well known. A psychic experience happened coincidentally with a somatic symptom as for example, the sound of a trumpet with gastric secretion stimulated by a meal. Later, the same somatic symptom may occur without somatic cause merely in response to the same somatic experiences, in this case the sounding of the trumpet without the meal. Then suppose a lady suffers from an infectious enteritis. In this condition she has an unfortunate sex experience. From that time on she suffers from constant compulsive diarrheas which stand in readily discernible relationship to her sexual life.

Even without a conditioned reflex the site of some previous somatic disease becomes readily the site of an organ neurosis. An hysterical individual, for example, develops psychopathic swelling of joints having previously suffered from a rheumatic arthritis. The body has learned, as it were, the symptom. Furthermore, the sense of well-being remains decreased in a bodily part that has once been ill. This is the basis for the phenomenon of Hängenbleiben described by Heyer. The pain caused by somatic disease long outlasts the duration of actual organic disease.

A symptom having its origin in organ symbolism may nevertheless become a conditioned reflex in its own right and then become activated through bodily processes without further psychic causation. Cardiospasm may develop as a psychogenic organ symbol, then the psychic cause drops out and the symptom remains as a response to the act of swallowing.

The following cases studied in the Massachusetts General Hospital in collaboration with the gastro-enterologist, Dr. Chester M. Jones, illustrate the type of material and the application of the foregoing psychobiological theories.

CASE 1. (P. F.) An American housewife, aged thirty-nine, has been seen in the medical clinic of the outpatient department since 1931. Her chief complaint is pain in the epigastrium, regurgitation of food and malnutrition. In 1932 it was demonstrated that she had constriction in her esophagus. This was relieved by surgical interference. Subsequently, however, her symptoms recurred and her cardiospasm has been relieved by the use of nitroglycerin. She now feels quite dependent on nitroglycerin which relieves the dysphagia and the cardiospasm and vomiting. At times, however, she is able to go several days without the symptoms of cardiospasm. Her social history reveals that she is the mother of two sons; the older son, seventeen, is an epileptic having frequent convulsive seizures. Her younger son of thirteen is mentally retarded. Her husband is an electrician and earns a small salary. She is a woman of considerable intelligence and cultural background with a love for the "better things in life". She says that she is making the best of life. She has only part of the necessities and none of the luxuries. She has been interested in reading and in writing, has written poems and sonnets that have been published in magazines and papers. The husband is a kindly, gentle, unromantic person.

Personality Characterizations: The patient is imaginative, romantic and obviously forced to live in a social atmosphere and at an economic level far below that which she desires. She has extreme apprehension and fear regarding the situation of her older son. She is somewhat concerned about the younger boy. Her sexual life is only fairly well adjusted and the other factors surrounding her environment enter into her emotional manifestations. She is tense, apprehensive, has fantastic dreams, usually wish-fulfillments. Her cardiospasm and physical symptoms are always intensified by periods of worry as for instance following an epileptic seizure in the case of her older boy or following a period of depression over her social and economic dissatisfaction. A positive transference to different physicians in the clinic has been quite obvious. It is felt that she could probably get along without nitroglycerin, only she feels that that might necessitate the termination of her visits to the clinic. The psychosexual mechanism here is likewise important. It is felt that this patient has been helped by psychotherapy inasmuch as her symptoms are less marked. Her cardiospasm may be cured by a longer period of intensive psychotherapy which in this case would necessitate a complete control of the patient with careful medical and x-ray studies that could only be obtained through hospitalization.

CASE 2. (E. M.) A thirty-five year old English born, married butler has suffered from duodenal ulcer with bleeding, also from hemorrhoids. This patient has been followed in the gastrointestinal clinic by the internist with surgical consultation. Inasmuch as he seemed to be somewhat depressed and under emotional tension he is now being followed in addition by the psychiatrist. The following social and psychological factors were revealed, increased worry and extreme emotional tension occasioned first, because the wife of his employer became psychotic. This entailed a very exacting and trying period in his occupational duties in the home. Following this his brother became involved in financial difficulties which necessitated his lending his brother the greater part of his life savings. These savings he had planned on using for the education of his children but he was now compelled to give them to his brother to save him from disgrace and possible legal prosecution. This involved the patient in a domestic altercation with his wife who objected to the foregoing act. A period of loss of sleep with severe epigastric pain and recurrence of

bleeding from his ulcer together with loss of blood from his hemorrhoids brought him to the clinic in a condition of depression with a good deal of emotional tension. A repair of the hemorrhoids, a modification of his diet and a medical régime plus psychotherapy have relieved the symptoms and the patient is practically recovered although he is still being followed up in the clinic.

CASE 3. (O. E.) Aged twenty-six, was suffering from a severe ulcerative colitis. Examination of the psychobiologic factors brought out that this patient has suffered from ulcerative colitis for the past three years. The patient's older brother had distinguished himself as an explorer and writer as well as by making satisfactory progress in the university. The patient has done poor work scholastically, and in three years in the university has accomplished one year's credits. He is a special student. Three years ago his mother died and at about that time the patient fell violently in love with a young college girl. This affair became very soon an engagement. The patient lived in very close relationships with this young woman and finally after a year and a half the affair was terminated, the girl returning to her home in the Middle West. Last November the patient's colitis became worse necessitating hospitalization. The patient revealed a strong mother attachment and he had always had more or less unconscious hatred of his father. He was practically forced to give up his fiancée because of her father. There had been conflict in his mind with feelings of guilt over the intimate sexual relations that he had carried on with her.

While he had made an excellent record in his preparatory school work and had been a fairly good athlete, his accomplishments in college work have been almost nothing and his efforts seemed diffuse and his marks low with frequent failures. Attacks of colitis following emotional upsets and with emotional tension, depression, discouragement, feelings of guilt characterized the picture. Following fairly intensive psychotherapy the patient's colitis improved. He seems to have a good grasp on the underlying psychological factors and his emotional condition and his physical health are again for the first time satisfactory since his admission to the university three years ago.

CASE 4. (D. C.) The patient is a twenty year old male, married American of New England ancestry who entered the hospital with a high fever. A diagnosis of infectious mononucleosis was made. A few days later he developed an infection of his ethmoid and following the drainage of the latter his temperature subsided only to rise again with definite localizing pains in the right hip joint. Following surgical consultation and treatment of the hip joint, the patient became quite despondent and manifested depressive symptoms crying and exclaiming that he must die, that he could not get better.

The family history revealed that his mother is of a manic depressive type having suffered from more than one psychotic attack. The father is somewhat moody with well-marked periods of elation and depression. The father runs a country general store.

Past History: The patient's birth and early developmental history were normal. His school progress was satisfactory and, at the completion of his local high school course, he entered college two years ago. During that time he has been in love with a girl whom he visited as frequently as possible, at least once in two weeks. On the completion of his second year's college work last June he learned that this girl was pregnant. Reluctantly and after considerable hesitation he was forced by his father to marry the girl. In the autumn of 1935 about the time that his child was born he began to show some personality changes inasmuch as he seemed somewhat preoccupied and depressed. Because of his forced marriage to this young lady he was compelled to give up his college career and was employed in a small country store by his father. It was noticed that his work became very slow. He feared that he had made mistakes in making change and added up columns over and over in an obsessional manner. About this time while riding horseback he received abrasions on his ankles which became infected. This eventually led to the septic condition which necessitated his hospitalization. The patient when examined was mentally clear, although obviously depressed and under great emotional tension. From his own discussion of his psychological problems and from the foregoing history it appears that, the unexpected pregnancy leading him to marriage and the necessity for terminating his college course, as well as, his planned objective in life, together with an abrupt transition from a student life with college fraternity and athletic activities and all the enjoyment that went with it, to a position of working in his father's general store and the camaraderie of his village associates in a small town, caused extreme emotional disturbances of resentment and disappointment with feelings of guilt. Depression developed plus manifestations of anxiety and discontent with compulsive phenomena. These emotional factors unquestionably lowered this patient's resistance to the series of infections that have followed so that the patient presents a medical and surgical picture of sepsis and infection with a characteristic reactive depression in which the genetic and dynamic factors are well marked. This latter case emphasizes the importance of psychosomatic factors in the formulation and treatment of this type of problem.

REFERENCES

1. Henderson, L. J.: Physician and Patient as a Social System. New Eng. J. Med. **212**:819 (May 2) 1935.
2. Tillotson, K. J.: Liaison Work in Psychiatry. Proceedings of the Second Conference on Psychiatric Education. Pages 87-93, 1934.
3. White, W. A.: Twentieth Century Psychiatry. New York: W. W. Norton, Inc. 1935.
4. Dunbar, H. F.: Emotions and Bodily Changes. New York: Columbia University Press. 1935.
5. Schwarz, O., et al.: Psychogenese und Psychotherapie Körperlicher Symptome. Berlin: Julius Springer. 1925.

ROENTGEN THERAPY OF ACUTE POSTOPERATIVE PAROTITIS*

BY J. MAURICE ROBINSON, M.D.,† AND JACK SPENCER, M.D.†

ACUTE inflammation of the parotid gland may appear in the course of various debilitating diseases, usually as a terminal event. It also occurs as a not infrequent, highly fatal complication of major surgical procedures.

Statistics concerning its incidence after operative procedures of *all* kinds vary widely (Charlton,[5] 1 in 207 cases; Collins,[7] 1 in 762 cases; Beckman,[1] 1 in 2200 cases). Such figures depend almost entirely on the number of abdominal operations included in the group used as the basis of calculation; almost all of the postoperative cases reported in the literature have followed such surgery.[1, 3, 4, 5, 7, 12, 14, 16]

This close association with abdominal surgery is best explained by the theory (experimentally[2, 6] and clinically[3, 8, 10, 17] substantiated) that acute parotitis, terminal or postoperative, is usually an ascending infection of the gland from the mouth, occurring as a rule in individuals whose resistance has been undermined by age, disease, intercurrent infection, or the effects of a severe operation; and that the most constant predisposing factors to it are dryness of the mouth and a diminution in the flow of saliva, such as follows dehydration from any cause, hyperpyrexia, the prohibition of fluids by mouth or the administration of opiates or atropin.

In the presence of these conditions, infection of the parotid can be produced in animals by injecting cultures of staphylococcus aureus into Stenson's duct or by smearing the organisms on the orifice of the duct (Claissé and Dupré[6]; Berndt, Buck and Buxton).[2]

The work of Rolleston and Oliver[17] further confirms this theory; they found that acute parotitis was a frequent complication (4.5 per cent) in a group of 470 cases of gastric ulcer treated medically in which food and fluid by mouth were interdicted (although antiseptic mouth washes were used), occurring ten times more often than in a similar group not so treated (.04 per cent).

It is evident that serious abdominal operations, more than any other kind, are associated with the conditions most favorable for the development of this complication, principally because they are not uncommonly performed on very sick, dehydrated patients and because fluids by mouth are usually restricted postoperatively. Thus it is fairly common after any severely infected abdominal condition,[3, 5, 7, 15, 16] whether gastrointestinal, pelvic, or genito-urinary, appearing with greatest frequency after surgery on the colon (Rankin and Palmer,[16] 1 in 135 cases).

The actual mortality depends upon many factors: on the age and general condition of the patient, the type and extent of the operation, the virulence of the infecting organism, the extent of the parotitis and the method of treatment employed. As a whole, the death rate in those cases which suppurate is greater than in those that do not; and bilateral parotitis is considerably more fatal than unilateral.[3, 4, 16] But bilateral parotitis following a relatively simple abdominal operation is usually less of a catastrophe than, for example, unilateral parotitis after an abdominoperineal resection of the colon and rectum.[4, 17]

In great part, however, the mortality will depend upon the type of treatment employed. The time-honored method consists of the application of hot or cold compresses to the swelling, followed by incision if definite evidence of fluctuation is elicited; or, in the opinion of some surgeons,[3, 5] early incision even if such evidence is lacking.

The prognosis following such treatment is not very good; almost one-half of the patients die, according to the published reports (Rankin and Palmer 39 per cent,[16] Blair and Padgett 53 per cent,[3] combined American statistics of Green 58 per cent).[12] It is true that at least a third of these deaths can be ascribed to causes other than the parotitis.[4] In the remaining cases, however, the complication appears to be not merely a terminal event, but is apparently the immediate cause of death, usually representing the final blow to already weakened recuperative powers.

In 1930 Rankin and Palmer[16] reported the use of the radium pack in the treatment of postoperative parotitis. Their results left no doubt concerning its superiority over the compress and the knife. Of twenty cases treated by radium, four died (20 per cent) although they ascribed only one of these deaths to parotitis. Of fifty-eight cases treated in the usual way, twenty-three died (39 per cent).

Bowing and Fricke[4] have recently reviewed 185 cases from the Mayo Clinic, including the twenty cases of Rankin and Palmer. Practically all of them followed major operations. They were treated by one to four eight-hour applications of a pack consisting of two, three or four fifty-millicurie blocks of radon (or a

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corresponding amount of radium) filtered through 2 mm. lead, 1 mm. brass and 15 mm. silver, at a distance of 2.5 cm. from the skin. Twenty-two and eight tenths per cent of the patients died, although parotitis, according to the authors, was the immediate cause of death in only six per cent; the remaining 17 per cent dying of some other complication, the original lesion, or the effects of the operation.

It seems fair to assume that this figure (17 per cent) represents about the percentage that would die for the same reasons in a similar group of untreated cases, or cases treated by any method. If we exclude this 17 per cent from two such groups, one treated by the usual measures, including incision, the other by radium pack, it would appear that about 75 per cent of those who otherwise die from this complication alone can be saved by radiation (40 per cent less 17 per cent compared with 22.8 per cent less 17 per cent). Even if we consider all the deaths as failures of therapy, the salvage is still 50 per cent (22.8 per cent compared with 40 per cent).

In view of these statistics, one would expect that this method would be generally used in preference to other older forms of treatment. It is therefore surprising to hear surgeons occasionally express the opinion that these patients die or get better regardless of their parotitis. Such an opinion is certainly not based on any extensive study of the literature, nor can it be more than a mere impression derived from a few isolated instances in any one surgeon's practice. It is also surprising to find an article on this subject published as late as 1934[18] in which no mention is made of the use or value of radium treatment, emphasis being placed on prophylaxis and waiting for the infection to point before incision.

It is true that radium or radon is not more frequently used in the treatment of secondary parotitis because the amount required is not always available on short notice in most institutions. The value of radium in the treatment of this condition depends in great part on early application since it reduces the death rate principally by preventing the formation of a parotid abscess.[4, 16] Nor can the comparatively large amounts of radon or radium employed in the technique of Bowing and Fricke[4] be replaced by smaller amounts; if these are heavily filtered, the dose delivered from a one-inch distance is negligible; if applied without heavy filtration, close to the skin, a large, perhaps dangerous, dose may be delivered to the skin, but very little will reach the lesion below it.

High voltage roentgen therapy, however, suffers from none of these disadvantages: it is generally available, readily accessible, demands no particular preparation, delivers a uniform, easily controlled dose throughout the swelling, and does so in a few minutes as compared with the several hours required if a radium pack is used. For these reasons Dr. George W. Holmes early suggested its use at the Massachusetts General Hospital instead of the radium pack in the treatment of this condition.

Roentgen irradiation has long been advocated in the treatment of the chronic form of parotitis and has successfully replaced radium in the therapy of various other inflammatory conditions.[13] Fried[11] was the first to use and recommend roentgen irradiation for all forms of parotitis, acute or chronic. It was employed by Oettingen[14] in a group of sixteen cases of acute parotitis following laparotomy but he found it of little value. He admitted that his failure was probably due to the small doses of radiation employed by him, so that the amount delivered into the inflammatory mass was inadequate.

In 1935 Gerber mentioned its value in the acute postoperative form while discussing a paper of Dorrance's[9] on the treatment of chronic parotid inflammation. This is the only reference to its use that we have been able to find in the American literature, although it has been used, to our knowledge, in several clinics.

During the past three years, twelve cases from the wards and private wings of the Massachusetts General Hospital have been treated. Although the series is small, the results obtained would indicate that roentgen irradiation is therapeutically as effective as radium; in some respects it seems to be superior to it. Filtered high voltage or "hard" irradiation is employed. It is therefore necessary to move the patient to the x-ray department, but this has not proved to be a serious objection. It would be possible, of course, to approximate the desired "hard" ray by properly filtering a suitable portable apparatus, but this step entails certain difficulties, and so far we have not found it necessary. Lightly filtered or unfiltered radiation has not been used because of the difficulty of delivering the necessary dose without injury to the skin, or of uniformly distributing it throughout the inflammatory mass. Three hundred roentgens (occasionally 200 or 400 roentgens) are directed to the involved side, or, if bilateral, to each side, at one sitting through a 10 centimeter cone. The factors used are 200 kilovolt peak, 50 to 60 centimeters focus skin distance, .5 millimeter copper and 1 millimeter aluminum as filter, effective wave length .16 Angstrom units. The dose is measured without back scattering.

This represents approximately one-half skin erythema dose, and corresponds fairly well to the dose delivered to the skin by the radium pack of Bowing and Fricke[4]; the depth dose,

however, as we have already pointed out, is greater and more evenly distributed.

The essential data in these twelve cases are tabulated in chart 1. All of them followed laparotomy: three, cholecystectomy; two, resection of the colon; two, appendectomy; two, exploratory laparotomy; and one occurred after exploration for common duct stone.

There were three deaths (cases 5, 6 and 7); one of these patients was a woman of seventy-three years with general carcinomatosis and diabetes; another was a woman of eighty-three years with acute appendicitis and general peritonitis. In both, there was definite diminution of the swelling before exitus; obviously other factors than parotitis were the actual cause of death. The third patient, a man of fifty-nine years (case 7), with cirrhosis of the liver and common duct stone, died one week after complete disappearance of the parotid swelling.

Two cases suppurated and were incised, although both had shown some response to x-ray. In one of these patients, the condition when treatment was started may have been of longer duration than was stated in the patient's record, for there was perforation into the external auditory meatus within twelve hours of its presumable onset.

Bilateral involvement is generally considered to be definitely more serious than the unilateral form, with comparative mortalities of 56 per cent to 36 per cent when treated by the usual methods. Even after radium treatment many die. Although only thirty-two or 17 per cent of the patients in Bowing and Fricke's series[4] developed bilateral swelling, the mortality was 40 per cent as compared with 19 per cent in the unilateral group. The value of roentgen therapy was therefore most conclusively shown in the four patients with bilateral parotitis, representing one-third of our cases; these recovered completely (cases 1, 2, 3, and 4). One of them was practically moribund when treatment was started.

The usual history and course in our patients was as follows:

Two days to two weeks after operation there was a sharp rise in pulse and temperature. Soon after, the patient complained of pain at the angle of the jaw and trismus. A swelling below and in front of the ear appeared, rapidly increasing in size. Cloudy or frankly purulent secretion could sometimes be expressed from the reddened papilla.

Generally within four to twenty-four hours after the swelling was noted, roentgen treatment was given. The infection then took one of three courses:

(1) Within twelve hours of the treatment, the swelling and pain had increased markedly. In the following twenty-four hours both began to subside. At the end of three days to a week later, there was little or no residual evidence of inflammation.

(2) Within six to twelve hours, the pain had markedly decreased although the gland did not change in size. Twenty-four to forty-eight hours later, however, it was definitely smaller, and improvement continued as in the first group.

(3) There was no response to therapy for forty-eight hours, after which the fever, pain and swelling diminished very slowly.

The early disappearance of the pain and discomfort associated with the swelling was particularly striking in some of our cases. When the response was slow, the temptation to incise the mass was great. Delay was usually rewarded; the swelling eventually subsided without abscess formation or else became localized so that only a small incision was necessary.

Case 3 is of unusual interest because of involvement of both submaxillary glands twenty-five days postoperatively, eight days after the swelling of the parotid glands had completely subsided. Such a complication has rarely been noted, presumably because the mucin secreted by this gland possesses bactericidal properties.

In this patient the first evidence of infection appeared as a swelling of the right parotid twelve days postoperatively, followed within twelve hours by involvement of the left. Both sides were radiated the next day. Within twenty-four hours of the second treatment, the pain and discomfort were much less, and the patient was able to open her mouth and take fluids. In six days all evidence of the infection had disappeared. Seven days later, twenty-four days postoperatively, the right, and a few hours later, the left submaxillary gland became swollen, forming a mass the size of a hen's egg extending into the mouth. Within five hours following radiation, the pain was much less marked. The patient was then transfused. Twenty-four hours later both glands had decreased in size, the pulse and temperature dropping to normal at the same time. Three days later there was no visible or palpable swelling. Some of the effect should no doubt be ascribed to the transfusion.

The action of radiation on the inflamed gland, whether radium or x-ray is used, is analogous to its action in other inflammatory conditions; if applied early it often aborts the process completely, or causes early localization; later it may cause similar localization or have no effect. The pointing which follows the localization of a carbuncle, for example, is as a rule replaced by drainage through the duct in the case of the parotid. The analgesic effect of radiation on inflammatory processes has often been noted.

Although the final result is practically the same, roentgen radiation seems to have a more immediate effect on the pain and swelling than

radium, probably because the depth dose is greater. Following radium there is usually no appreciable change for twenty-four to forty-eight hours, after which improvement is rapid. (Rankin and Palmer[16], Bowing and Fricke[4].) In several of our cases improvement was noted within the first twelve hours.

There is no doubt that whichever form of radiation is used—radium or roentgen ray—the best results follow early application.

Although we have limited ourselves to a consideration of postoperative parotitis, it may be said that radiation has essentially the same effect on the parotitis which sometimes occurs in the course of various severe diseases—nephritis, bacterial endocarditis, etc. In these cases, however, the parotid infection is usually a terminal phenomenon and the patient dies from other causes.

SUMMARY AND CONCLUSIONS

1. Twelve cases of acute parotitis occurring as a postoperative complication of laparotomy are reported. All of these were treated by filtered high voltage roentgen radiation.

2. The results indicate that this form of therapy, properly administered, will definitely reduce the high mortality usually associated with this infection. The most striking effects are observed in those cases which are treated soon after the first evidence of inflammation of the gland is obtained. As a rule pain is soon relieved and suppuration is prevented.

3. As far as the final results are concerned, roentgen rays seem to be at least as satisfactory as the radium pack. Roentgen radiation, however, is not only therapeutically effective and rapid in action, but generally available and convenient to use. It therefore appears to be the treatment of choice.

4. The optimum dose is about 300 roentgens (approximately one-half skin erythema dose) delivered to the lesion in one sitting.

We are much indebted to Drs. Arthur W. Allen and Richard H. Wallace for the use of cases 3, 4, 7, and 9. We particularly wish to thank the latter for his interest and suggestions in the preparation of this article.

REFERENCES

1. Beckman, E. H.: Complications following surgical operations. A report of the complications in a series of 6825 surgical operations performed in the Mayo Clinic in the year 1913. Coll. Papers Mayo Clinic **5**:776, 1913.
2. Berndt, A. L.; Buck, R., and Buxton, R. von L.: Pathogenesis of acute suppurative parotitis. Experimental study. Am. J. M. Sc. **182**:639 (Nov.) 1931.
3. Blair, V. P., and Padgett, E. C.: Pyogenic infection of the parotid glands and ducts. Arch. Surg. **7**:1 (July) 1923.
4. Bowing, H. H., and Fricke, R. E.: Radium treatment of post-operative parotitis. Radiology **26**:37 (Jan.) 1936.
5. Charlton, P. H.: Post-operative parotitis. Ann. Surg. **93**:837 (April) 1531.
6. Claissé, P., and Dupré, E.: Quoted by Rankin and Palmer. Les infections salivaires. Arch. Med. Exper. **6**:250, 1894.
7. Collins, C. U.: Parotitis as a postoperative complication. Surg. Gynec. & Obst. **28**:404 (April) 1919.
8. Custer, R. P.: Acute supupurative parotitis. Pathologic and bibliographic study with report of 2 cases. Am. J. M. Sc. **182**:649 (Nov.) 1931.
9. Dorrance, G. M.: Treatment of chronic infection of parotid gland. Am. J. Roentgenol. **33**:803 (June) 1935.
10. Fenwick, W. S.: Prevention of parotitis during rectal feeding. Brit. M. J. **1**:1297 (May 29) 1909.
11. Fried (Quoted by Oettingen, E. N. von): Strahlentherapie **46**:651, 1933.
12. Green, M. T.: Post-operative parotitis as complication of abdominal surgery. Tri-State M. J. **7**:1406 (Jan.) 1935.
13. Hodges, F. M.: Roentgen therapy of certain infections. Am. J. Roentgenol. **35**:145 (Feb.) 1936.
14. Oettingen, E. N. von: Parotitis und Röntgentherapie. Strahlentherapie **46**:651, 1933.
15. Paget, S.: Parotitis after injury or disease of the abdomen or pelvis. Brit. M. J. **1**:332 (Feb. 12) 1887.
16. Rankin, F. W., and Palmer, B. M.: Post-operative parotiditis: treatment without and with radium. Ann. Surg. **93**:1007 (Dec.) 1930.
17. Rolleston, H. D., and Oliver, M. W. B.: Secondary parotitis due to oral starvation in the medical treatment of gastric ulcer. Brit. M. J. **1**:1296 (May 29) 1909.
18. Talbot, H. S.: Acute suppurative parotitis: its etiology, pathogenesis, and treatment. Am. J. Surg. **25**:267 (Aug.) 1934.

MARRIAGE AND MENTAL DISEASE*

BY NEIL A. DAYTON, M.D.§

THE marital status of 61,222 first admissions to New York† and Massachusetts‡ mental hospitals over the five-year period, 1928 to 1932 inclusive, is presented. In Table 1 the single, married, widowed and divorced first admissions are compared with the same groups fifteen years and older in the general population of the two states (1930 U. S. Census). An admission rate per 100,000 of the general population for each marital group is then calculated. Graph 1 shows marked differences between the admission rates of the individual marital status groups. The married present the lowest rates, the single are next in order, the widowed show higher rates, while the divorced are highest of all. These differences are made clearer by presenting the ratios. If the married groups are considered as one (1.0), the ratios for the occurrence of mental disease in the other groups are as follows:

	New York	Massachusetts
Married	1.0	1.0
Single	1.4	1.4
Widowed	2.6	2.6
Divorced	3.5	3.8

Individuals who are married have the least chance of being admitted to a mental hospital. From the biological viewpoint this rather fits in with other findings. We know, for example, that married men live longer than the single, and married men who have children show an even longer life span. If the married group

*From the Division of Statistics and Research (R. F. No. 35,093), Massachusetts State Department of Mental Diseases. Miss Harlet Dolan, Statistician, Department of Mental Diseases, collaborated in the collection of data.

†Annual Report of the Department of Mental Hygiene, New York. Legislative Document No. 29 for years 1928, 1929, 1930, 1931 and 1932.

‡Annual Report of the Commissioner of Mental Diseases, Massachusetts. Public document No. 117 for years 1928, 1929, 1930, 1931 and 1932.

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CHART 1.

	Hospital Number	Age	Sex	Diagnosis	Operation	Post-operative Condition	Side Involved	Post-operative Day of Onset	Dosage in Roentgens	Accessory Treatment	End Result	Comment
1.	B. M. 7288	32	F	Tuberculous peritonitis. Partial intestinal obstruction.	Laparotomy. Lysis of adhesions.	Fair	Bilateral	3 right 3 left	200 200	None	Recovered	Completely subsided in three days.
2.	M. G. H. 339437	57	M	Carcinoma of stomach.	Polya resection.	Poor	Bilateral	11 left 13 right	300 300	None	Recovered	Treatment followed by purulent discharge from both ducts. Swelling completely subsided in 4 days. Recovery in spite of very poor general condition.
3.	B. M. 22238	59	F	Carcinoma of ileocecal valve.	Resection of right colon.	Fair	Bilateral parotitis and bilateral submaxillitis	12 right 13 left 25 right 26 left	300 300 300 300	None	Recovered	Pain diminished in both parotids in 24 hours. One week later, all swelling gone. Developed swelling of both submaxillary glands 25 and 26 days postoperatively. Dramatic response to radiation beginning 5 hours after treatment. Swelling gone in 3 days.
4.	P. H. 12765	45	M	Cholecystitis.	Cholecystectomy.	Good	Bilateral	3 right 3 left	300 300	None	Recovered	Next day, swelling double in size. Third day, began to subside; purulent discharge from ducts. One week later, completely well.
5.	M. G. H. 348818	73	F	General carcinomatosis. Diabetes.	Laparotomy. Biopsy of omentum.	Poor	Right	1	300	None	Died	Definite improvement noted in 12 hours. Died third postoperative day.
6.	M. G. H. 343521	83	F	Acute appendicitis. Generalized peritonitis.	Appendectomy, with drainage.	Poor	Left	18	300	None	Died	Completely subsided in 3 days. Died 2 days later.
7.	B. M. 15486	59	M	Cirrhosis of liver. Common duct stone.	Exploration of common duct. Jejunostomy.	Good	Right	11	300	None	Died	Completely subsided 8 days after treatment. Died one week later.
8.	M. G. H. 343762	40	F	Cholelithiasis.	Cholecystectomy.	Good	Right	10	300	None	Recovered	Completely subsided in 5 days.
9.	B. M.	45	F	Cholecystitis. Cholelithiasis.	Cholecystectomy.	Good	Right	5	200	None	Recovered	Began to subside; remained stationary for 3 days. Gradual improvement the following week.
10.	M. G. H. 352137	16	M	Acute appendicitis.	Appendectomy.	Good	Right	5	300	Incision	Recovered	Perforated into external auditory meatus 12 hours after first treatment. Subsided somewhat. Treated again 5 days later. Incised 2 and 6 days after this. Recovery.
11.	B. M. 21644	36	F	Chronic pelvic inflammatory disease.	Hysterectomy. Colporrhaphy.	Good	Right	2	400	Incision	Recovered	Began to subside 24 hours after radiation. Six days later, fluctuation. Abscess incised. Recovery.
12.	M. G. H. 344717	52	M	Adenocarcinoma of rectum.	Combined abdominoperineal resection.	Good	Left	3	300 (left) and 300 (right) (24 hrs.)	None	Recovered	Dose repeated in 24 hours from opposite side because not responding. Completely subsided in 5 days.

is biologically superior to the unmarried, then this may be reflected in the low incidence of mental disease.

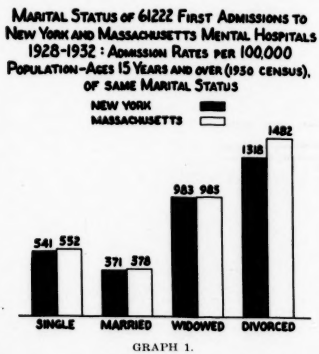
The single show admission rates that are somewhat higher than those of the married, but the ratio of 1.4 is not extreme. The single lack the marital inter-relationships which ordinarily provide elements of balance in the mental, physical, emotional and social fields. They have to face the task of depending upon self only, an achievement which man finds extremely difficult. The individual who is alone has more of an opportunity to overestimate the significance of happenings that center about himself. The married individual, through the home and family, has many external stimuli which are inimical to the development of introversion. In addition the single, lacking the shelter of the parental home and the protective factors afforded by marriage, are more open to a public inspection of their mental condition, and developing symptoms are quickly discovered.

In the group who marry something very significant happens when the marriage partner is withdrawn through death. While the shock surrounding the death of the husband or wife probably contributes to the development of mental disorder, clinical psychiatrists tell us an even more interesting story in this connection. Many of the widowed who develop mental diseases have been rather odd individuals for many years and have been protected for long periods by the husband or wife. Once this protective factor is removed through death, the mental disorder in the patient becomes aggravated and admission to a mental hospital becomes imminent. Again we find the attendant difficulties in being thrown back upon one's own resources. After years of interdependence the aging person who finds himself suddenly alone, faces a grave readjustment problem.

TABLE 1

MARITAL STATUS OF 61,222 FIRST ADMISSIONS TO NEW YORK AND MASSACHUSETTS MENTAL HOSPITALS, 1928-1932: NUMBERS AND RATES PER 100,000 OF THE POPULATION FIFTEEN YEARS AND OVER (1930) OF SAME MARITAL STATUS GROUPS

Marital Status	First Admissions, 1928-1932		General Population (15 Years and Over)		Rates per 100,000 Population	
	New York	Massachusetts	New York	Massachusetts	New York	Massachusetts
Total	45,632	15,590	9,435,747	3,122,314	483	499
Single	16,967	6,059	3,136,028	1,097,458	541	552
Married	20,451	6,594	5,500,881	1,740,235	371	378
Widowed	7,081	2,505	720,140	254,285	983	985
Divorced	695	380	52,713	25,630	1,318	1,482
Unascertained	438	52	25,985	4,706		


MARITAL STATUS OF 61222 FIRST ADMISSIONS TO NEW YORK AND MASSACHUSETTS MENTAL HOSPITALS 1928-1932 : ADMISSION RATES PER 100,000 POPULATION-AGES 15 YEARS AND OVER (1930 CENSUS), OF SAME MARITAL STATUS
NEW YORK
MASSACHUSETTS
541 552
371 378
983 985
1318 1482
SINGLE
MARRIED
WIDOWED
DIVORCED

GRAPH 1.

The divorced groups in both states show the highest admission rates of any of the marital groups. In comparison with the married, the divorced in New York have three-and-a-half times the chance of being admitted to a mental hospital. The Massachusetts ratio of 3.8 is even higher. A certain proportion of the divorced may be emotionally unstable or may possess other neurotic traits which make it difficult to preserve the family relationship. The factor of the removal of protection also plays a part. Symptoms minimized by the husband or wife may be thrown into relief once the marriage is terminated. Again, the divorce itself, like the death of the husband or wife in the widowed, may have precipitated an emotional crisis.

The admission rate for the Massachusetts divorced group is 12 per cent higher than that of the New York group. However, differences in the statutes of the states may account for this. The New York law is very rigid, sex delinquencies being the only cause admissible for divorce proceedings while Massachusetts accepts a number of causes. During the period 1928-1932 there were 23,229 divorces in New York, a rate of 246 per 100,000 of the population fifteen years of age and over (1930). The same period in Massachusetts showed 18,151 divorces, or a rate of 581. Proportionately, Massachusetts has twice as many divorces as New York. In basing divorce upon adultery alone, New York exercises a rigid selection of cases. Massachusetts probably has a larger proportion of divorces arising through emo-

tional, social and psychological deviations. Divorces in Massachusetts will thus tend to include individuals who are more of a risk in so far as the development of mental disease is concerned.

Those who enter marriage may be superior biologically in that they have less mental disease. That superiority, however, is of no avail unless the marriage is preserved. When the protection of the home and family is removed, both the widowed and divorced show more mental disorder than those who have remained single.

SUMMARY

Analysis is made of the marital status of 61,222 first admissions to New York and Massachusetts mental hospitals for the five-year period, 1928 to 1932 inclusive. The marital status of first admissions is then compared with the marital status of the general population fifteen years and older of these States.

The admission rates for the married group are the lowest and those for the single group are next in order. The low rates for the married do not apply unless the marriage is preserved. If the marriage is dissolved through death or divorce the admission rates rise to much higher levels than for those who remain single.

Apparently marriage is a protective factor of considerable significance in the development of mental disorder.

NEW HAMPSHIRE MEDICAL SOCIETY

SCIENTIFIC SESSIONS

THE Opening Session of the One Hundred and Forty-Fifth Annual Meeting of the New Hampshire Medical Society convened in the Ball Room of the Hotel Carpenter, Manchester, New Hampshire, on Tuesday morning, May 26, 1936, at ten o'clock, with President Abbott presiding.

PRESIDENT ABBOTT: The One Hundred and Forty-Fifth Annual Meeting of the New Hampshire Medical Society is now in session.

We shall open the meeting with a paper, "The Irritable Colon: Diagnosis and Treatment by the General Practitioner," by Dr. J. Dunbar Shields of Concord.

The following two papers were also read:

"Artificial Pneumothorax in the Treatment of Tuberculosis," John D. Spring, Nashua. Discussion opened by Robert B. Kerr, Manchester, and Robert M. Deming, Glencliff.

"Diuretics and What They Do," Henry A. Christian, Boston, Hersey Professor of Theory and Practice of Physic, Harvard Medical School. Discussion opened by Bruce Snow, Manchester, and Walter F. Taylor, Keene.

TUESDAY AFTERNOON, MAY 26, 1936

PRESIDENT ABBOTT: The meeting will please come to order.

Our first business this afternoon is the presentation of the Fifty-Year Membership Gold Medal to Dr. Ellen A. Wallace of Manchester.

Dr. Wallace, it is my pleasure to present to you the New Hampshire Medical Society gold medal, to commemorate fifty years' membership in this Society.

This also infers fifty years' medical service to your fellow-men.

I believe that you are the second woman to be so honored by this Society. When you started in practice, the woman physician was somewhat of an innovation. She was supposed to care principally for women and children. But today, thanks to the quality of the women that have entered practice, medicine knows no sex. The woman is measured only by the same standards of professional attainments as the man.

Some years ago, Sir William Osler, on an occasion to honor Dr. Mary Putnam Jacobi, said, in effect, that he was looking for the really great woman physician, one who would rank with the Hunters, the Jenners, the Pasteurs and the Listers. But, he said that he was not looking for her on the practical side of medicine; he wanted her on the scientific side.

If that was true then, why not today?

If I were to advise a young woman entering medicine as to what branch to follow, I would advise against general practice, surgery and gynecology, believing that there is a greater opportunity for advancement and a more congenial life in the sciences.

Taking into consideration woman's superior ability for fine, technical details, I would suggest research, the pathological laboratory, x-ray or ophthalmology.

Dr. Wallace, I congratulate you on living and practicing medicine for fifty wonderful years.

DR. ELLEN WALLACE: *Mr. President, Members of the New Hampshire Medical Society, and Friends*—I thank you most heartily for this gift of recognition of my fifty years of membership in the Society.

When I decided to settle in Manchester, I came down from my home in Concord to make

the customary call upon the physicians. Among them was Dr. George Crosby, who was exceedingly kind and gave me most excellent advice and suggestions. But, as I was leaving his office, he said, "Now, you must go out for yourself." I replied, "I cannot do it, Doctor." His answer was, "Then go back to Concord and stay there."

We have heard a great deal, and we all know that there have been great advances in medicine and surgery during the last fifty years. There have been as great advances in preventive medicine.

In college, we had an excellent professor in hygiene, and I became very much interested in the subject. The tubercle bacillus had been discovered but a short time before, and everybody was very hopeful with enthusiasm for the preservation of life which previously had been doomed. The District Nursing Association, one of the first of such agencies in America, was established a short time before that. I boarded in the home with the nurses, making, during my postgraduate work, many calls with them.

At that time, there were practically no articles in newspapers or magazines in regard to health.

When I returned to New Hampshire, the doctors were still treating their consumptive patients with sedative cough mixtures, and telling them they had chronic bronchitis.

The common drinking cup was used in churches, schools and on railroad trains. Milk inspection was a political job, the work, as a rule, being only to issue the annual census. There was not a public health nurse in the State.

Here was a wonderful opportunity for pioneer work, I approved of it, and practiced according to the best of my ability and with all the spare time I could take from my general practice.

Were you to ask me today, if I could live my life over again, and knowing what I do, would I study medicine, my answer would be, "I surely would."

I believe there is nothing that can give more satisfaction than to know how to relieve suffering and perhaps save life.

Furthermore, I would join the New Hampshire Medical Society.

PRESIDENT ABBOTT: Thank you, Dr. Wallace.

It is my great pleasure to present my neighbor, Dr. Frederick L. Hawkins, who has practiced medicine for fifty years, but who, unfortunately, has not been a member of the Society for fifty consecutive years, so he does not get a medal.

DR. FREDERICK L. HAWKINS: *Mr. President and Members of the New Hampshire Medical Society*—Some three weeks ago, I got a letter from the Secretary, summoning me to appear before this body and to show cause for my having continued to practice medicine for fifty years.

I shall have to plead guilty, of course, that I have done this, but I didn't see what ground he had for his question, or what he had to do about it anyway, or what business it was of his.

He said that I had practiced medicine for fifty years. I can only recall that one Sir William Osler said that after the physician got to be sixty years old, he ought to be chloroformed. I thought that was rather a serious business for me. But I have in my favor, for a reply, that Sir William did not take his own medicine; he lived for three score years and then, died a natural death. So I have that for my argument as to why I should stand up for my cause.

Perhaps another plea would be that I didn't intend to do this. Fifty years, to you younger men and women, mean a whole lot. When I was twenty-five years in practice, I thought it would be my goal to practice that long and to save a thousand dollars each year; then I was going to have a house by the side of the road, perhaps by the side of Lake Winnepesaukee, and I was going to fish and hunt the rest of my days.

But, when the twenty-five years were up, I didn't make the grade. I didn't have the $25,000, notwithstanding that I had earned it. Some other fellow got it, because I didn't.

Perhaps I might be classified as a self-satisfied physician. I went into a little town fifty years ago this month, and I stayed in that little town all the time. I know all the people there, from the father and mother to the grandfather and grandmother, and I don't have to go into the family history of any of them to know about them. I keep no records except those in my head.

I was satisfied with everything that came along. In those years, I have been through the snowshoe stage of transportation, down through the horse and buggy, the bicycle and the automobile stages. I have visited my patients on snowshoes. Many of you men probably never drove a horse, so you don't know what an animating thing it was to do, to sit behind a good horse, chirp to him and get over the ground. You men today are regular hothouse plants. You have all these closed cars to protect you from the lightning and the rain. We had to go through all kinds of weather. Today, you sit in an automobile, which is shielded from the wind and the weather, with a heater inside of it, and it is like sitting in your own home.

We hear a great deal about the welfare question. To my mind, there is no man or body of

men, including secret societies, churches and other organizations, who have done so much for the general welfare of the community as the medical profession in the past fifty years. I dare say, and Dr. Wallace will bear witness to this, that I have given to charity about $1,000 a year. But, I am not going to claim that amount; I am going to estimate that it was $500. Now, in fifty years, that would be $25,000, and that is quite an item. Somebody owes that amount to me and to Dr. Wallace and to those who have done these things.

Now, there is a great cloud before the medical profession today. I can't solve it; it is too deep for me. It is this social medicine. Perhaps it is up to you men to fight it out. We older ones have put up a good fight, and have kept the faith, so now it is up to you to see that it is fought out to the finish, because we older ones will pass out of the picture. So we hope that you will continue and fight the thing out and get what justly belongs to the medical profession in years to come.

In closing, I wish to give this little toast to the Society and to each individual.

"Farewell, and if forever, then forever
fare thee well."

PRESIDENT ABBOTT: We have another member of our Society who has practiced medicine for fifty years, but he is unable to be with us today. I am referring to Dr. J. Franklin Robinson of Manchester. He has, by this time, received a letter of congratulation from the Society.

We have with us this afternoon, also, Dr. Mary S. Danforth of Manchester. She has been a member of the Society for fifty-eight years.

Dr. Danforth, won't you please stand up so that we may see you?

[Dr. Danforth then rose, and was greeted with a tremendous ovation of applause from the audience.]

VICE-PRESIDENT KITTREDGE then assumed the Chair.

CHAIRMAN KITTREDGE: *Ladies and Gentlemen of the New Hampshire Medical Society*—It is very interesting to me to listen to Dr. Wallace, as well as to Dr. Hawkins, because during his first three years of the practice of medicine, he was a neighbor of mine. I happened to be at that time in Centre Harbor, and he was in Meredith. Needless to say, there was competition between us, but it was always friendly. I am one who can always bear witness to the fact that Dr. Hawkins has always done his work well.

It is now my pleasure, as Vice-President of the New Hampshire Medical Society, to introduce to you the President of the Society, Dr. Clifton S. Abbott.

Dr. Abbott delivered the President's Address.

This address was followed by a Symposium on Pediatrics, with the following titles and speakers:

a. "Medical Aspects."

Richard M. Smith, Boston, Assistant Professor of Pediatrics, Harvard Medical School. Discussion opened by Ursula G. Sanders, Concord.

b. "Surgical Aspects."

William E. Ladd, Boston, Clinical Professor of Surgery, Harvard Medical School. Discussion opened by MacLean J. Gill, Concord.

c. "The Prevention and Modification of Certain Communicable Diseases."

R. Cannon Eley, Boston. Discussion opened by Abbott L. Winograd, Nashua.

WEDNESDAY MORNING, MAY 27, 1936

The Session convened at ten o'clock in the forenoon.

PRESIDENT ABBOTT: The meeting will please come to order. We desire this morning to recognize our visiting delegates from our neighboring States. I am going to call upon the State of Maine first.

DR. EARLE RICHARDSON: *Mr. President and Members of the New Hampshire Medical Society*—Our officers wish to extend to you all an invitation to attend our Annual Meeting at Rangeley, beginning on Sunday evening, June 21, and continuing throughout the twenty-second, and twenty-third of June.

I enjoyed very much coming up here today. Years ago, I taught school in New Hampshire for a year, and so I have always had a good feeling toward this State.

I didn't know that I was supposed to say anything. In our State, we are going on in about the same way as most States are.

Last year, at the last Legislature, we got through a two-year law on malpractice suits. There are several bills before the next Legislature, which we are hoping to get through. One of them, which we failed to have passed, was to have a provision for a lien law in accident cases. As you probably know, the lawyer gets the fee, and if the doctor and the hospital receive their share, they are lucky. I can think of one case where I lost $500. A man was up for murder and the lawyer who was representing the defendant came to me before the trial. The defendant was out on bail. He was in an accident, and I attended him in the hospital for a considerable number of weeks, so I know about this case. The lawyer asked me if I couldn't keep him over an extra week. I didn't understand that he didn't want to have the case come up before a certain judge in the Supreme Court. Anyway, they finally went to trial for

the accident case before the murder case came up, and the man got a verdict of $2500. The lawyer took it all and I got nothing. I have been unable to collect a thing.

We are trying to get through in the next Legislature a law which will protect doctors and hospitals.

Again, I want to thank you for your courtesy, and to tell you that I have enjoyed coming here as a delegate.

PRESIDENT ABBOTT: Are there any other delegates here this morning?

DR. GASLON of Connecticut: *Mr. President, Members of the New Hampshire Medical Society, and Visiting Delegates*—It is not only a great pleasure, but it gives me a great deal of personal pride and satisfaction to be able to be present today and to bring to this Scientific Body the greetings and good wishes of the Connecticut State Medical Society.

In reviewing the program, I should say that your Program Committee should be congratulated upon the unique quality and breadth of the scientific papers. I feel that each member departing from these sessions will return to his or her practice with a clearer conception and a better understanding of the subjects discussed during the Scientific Sessions.

Gentlemen, on behalf of the Connecticut State Medical Society, I wish to thank you for your kindness and your courtesy to me during my brief visit with you.

PRESIDENT ABBOTT: Are there any other delegates present?

I believe Dr. Tabor of Lowell is one of the delegates from Massachusetts, and it is a pleasure to call upon him at this time.

DR. TABOR of Lowell, Massachusetts: It is a great pleasure to be here, Ladies and Gentlemen, and I wish to take this opportunity to extend to you the greetings of the Massachusetts Medical Society.

The program for this session was as follows:

"Problems in the Diagnosis and Treatment of Bronchiectasis." M. Dawson Tyson, Hanover. Discussion opened by Robert M. Deming, Glencliff, and Leslie K. Sycamore, Hanover.

"More Rational Methods in the Prevention and Control of Eclampsia," J. O. Arnold, Philadelphia, Professor of Obstetrics, Temple University. Discussion opened by Benjamin P. Burpee, Manchester, and Robert O. Blood, Concord.

"Public Relations of the Medical Profession," Morris Fishbein, Chicago, Editor, *Journal of the American Medical Association.*

WEDNESDAY AFTERNOON, MAY 27, 1936

The Session convened at 2:00 p. m., with President Abbott presiding.

PRESIDENT ABBOTT: The meeting will please come to order.

Members of the New Hampshire Medical Society, I wish to present your new President, Dr. Frank E. Kittredge, at this time.

PRESIDENT-ELECT KITTREDGE: *Mr. President, Ladies and Gentlemen*—I wish to thank you for the feelings which you apparently have toward me, as evidenced by your applause.

I wish also to thank you for the honor you have conferred upon me at this time. It is, indeed, an honor, for any medical man to be elected President of his State Society, whether in New Hampshire or any other state.

The Presidency of the State Society of a comparatively few years ago was a much different responsibility than it is today. At that time, all he had to do was to preside at the State meetings for a couple of days, don his dress suit on the evening of the first day, stand in line and receive his guests, and incidentally pay for the refreshments, deliver his address the next day, and say something, possibly, at the banquet in the evening.

But today, the Presidency of the State Society is quite a different proposition.

The New Deal is ringing our front door bells, while its handyman is endeavoring to enter the back door or the window, in the guise of socialized or state medicine. All of these movements require the utmost vigilance on the part of the officers of your Society; otherwise, we would very soon lose our rights, our liberty and our self-respect as practitioners of medicine. In no other way could we care for our patients with the requisite amount of scientific and sympathetic care that they are entitled to receive, and desire to have.

I attended a meeting of the House of Delegates of this Society on Monday evening. It was the first meeting of that body that I had ever attended. I was amazed at the amount of work that was accomplished there. It was a meeting that lasted well after midnight, and the delegates were all prompt in arriving at the appointed hour. You can imagine what they went through in the way of reports, and laying out work for the coming year.

I can visualize from that meeting just what is expected of the President during this coming year, with committee meetings, legislative proceedings, attending county meetings at least once a year. And my predecessor, Dr. Abbott, has kindly informed me that I am expected to prepare an address now and then. So I am inclined to think that I shall have a very busy year.

But, I wish you all to know that I shall make every effort, so far as my strength and ability permit, to fulfill my obligations to the New Hampshire Medical Society.

PRESIDENT ABBOTT: Dr. Metcalf is going to give us a condensed report of the House of Delegates.

SECRETARY METCALF: One of our officers, Dr. Arthur T. Downing of Littleton, New Hampshire, is very ill, and may not recover. At the suggestion of the President, and with your approval, I am sending him the following telegram:

"The New Hampshire Medical Society now in session, in appreciation of your high standards of practice and devoted service to medicine in New Hampshire, sends you its greetings and best wishes."

The House of Delegates, during its recent sessions, has done the following things:

The meeting of this Society next year will probably be held on daylight saving time. We are planning to have one morning, if suitable accommodations can be obtained, devoted to round table discussions, instead of to the ordinary platform addresses.

The House of Delegates voted to co-operate with the State Board of Health in promoting the medical phases of the Social Security Act. This does not mean sickness insurance, or State medicine, but just those phases which relate to crippled children, to welfare and to the improvement of the public health services.

There were two or three reasons why the House of Delegates made this decision. The first reason is that this plan is going through anyway. The second reason is that the federal government has been rather more friendly in the matter than some of us anticipated, and seemed to want these medical phases to be managed by doctors, rather than by laymen. This being the case, it seemed to the House of Delegates better, not only for the patient, but for the Society itself, to be on the inside. The Committees of our Society now in existence are going to function in an advisory and in an executive capacity in this set-up.

The Committee on Public Relations was authorized if and when it becomes necessary to secure a paid legislative representative.

The Committee on Public Relations, with the co-operation of the Committee on Tuberculosis, was advised to procure, if possible, additional beds at the Tuberculosis Sanatorium at Glencliff, which is now much overcrowded.

Several months ago, the insurance companies approached me with the request that the State Medical Society should formulate a fee schedule to be used in compensation cases. That matter was referred to the several county societies, and it has now been referred to the Committee on Medical Economics, with the request that that Committee shall report at the future meeting of the House of Delegates as to the advisability of having or not having such a fee schedule.

The House of Delegates asked me to remind you that *The New England Journal of Medicine* may be obtained throughout the year, the fifty-two copies, for $3. The New Hampshire Medical Society pays for each of its members $1 a year, for which each member receives twelve copies; for $3 more, you may have the other forty copies, and this is virtually half price.

The services of the Speakers' Bureau have been lent to the Women's Auxiliary. The Secretary of the Auxiliary approached me and said that they would like to arrange meetings among women's clubs, among the League of Women Voters and such organizations, where it might be desirable to give medical addresses. We told them that we would furnish the doctors, if they would arrange the meetings.

Your new Vice-President is Dr. Samuel T. Ladd of Portsmouth.

I wish, also, to report a case of nepotism. I am told that the next President of the Auxiliary is Mrs. Carleton R. Metcalf.

PRESIDENT ABBOTT: Dr. Thomas W. Luce will now give you the report of the Trustees of our Society.

REPORT OF THE TRUSTEES OF THE NEW HAMPSHIRE MEDICAL SOCIETY

For the Year Ending May 1, 1936

RECEIPTS

December 16, 1935—A liquidating dividend of 5% from the Merrimack River Savings Bank. This was deposited in the Portsmouth Trust and Guarantee Co. Book No. 12813	$91.70
April 14, 1936—A check from the Treasurer for the General Fund. This was deposited in the Nashua Trust Co. Book No. 41382	$1,000.00

EXPENDITURES

August 12, 1935—Paid Dr. D. G. Smith by check on the Portsmouth Trust and Guarantee Co. This for his expenses as a delegate to the meeting of the A. M. A.	$76.49
May 1, 1936—Paid Dr. John D. Spring from the Burnham Fund. This for his essay entitled "Artificial Pneumothorax in the Treatment of Tuberculosis."	$50.00

SPECIAL FUNDS

The Bartlett Fund

Deposit in the Portsmouth Savings Bank Book No. 21110. The original bequest ($352.11) is to be kept as a permanent fund	$5,802.04

The Pray Fund

Deposit in the Strafford Savings Bank Book No. A 42. $1,000.00 of this must be kept permanently, the income to be expended for prize essays 1,391.88

The Burnham Fund

Deposit in the New Hampshire Savings Bank Book No. 80106. $1,140.00 of this must be kept permanently, the income to be expended for prize essays; $50.00 has been drawn out for this use in 1936 ..... 1,963.22

The Benevolence Fund

Deposit in the New Hampshire Savings Bank Book No. 99559. This fund is to be allowed to accumulate until it totals $10,000.00 ..... 1,174.95

The General Fund

Deposit in the Portsmouth Trust & Guarantee Co. Book 12813 ..... 3,225.13
Deposit in the New Hampshire Savings Bank Book No. 35696 ..... 5,061.89
Deposit in the Nashua Trust Co. Savings Dept. Book No. 4382 ..... 1,512.87

Total Funds on Deposit $20,131.98

FUNDS NOT FOR GENERAL USE

The Bartlett Fund	$352.11	
The Burnham Fund	1,963.22	
The Pray Fund	1,391.88	
The Benevolence Fund	1,174.95	
		$4,882.16

Present Funds available for General Use $15,249.82
Funds available for General Use, May 1, 1935 ..... 13,810.16

Net Gain for the Year $1,439.66

The balance due the Society from the Merrimack River Savings Bank (Book No. 26934) in process of liquidation is $641.88. Your Trustees regard this of little value.

The accounts of the Treasurer have been examined and found to be correctly cast and properly vouched.

(Signed) THOMAS W. LUCE,
HENRY O. SMITH.

The program concluded as follows:

"Recent Advances in Urologic Surgery, Including Renal and Prostatic Surgery. Experiences with a New Operation for Impotence," Oswald S. Lowsley, New York City. Discussion opened by Elmer J. Brown, Manchester, Richard W. Robinson, Laconia.

"Coronary Disease, Including Angina Pectoris," William D. Stroud, Philadelphia, Professor of Cardiology, University of Pennsylvania Medical School. Discussion opened by Granville E. Hoffses, Manchester, and Harry T. French, Hanover.

CLIPPINGS FROM THE BULLETIN OF THE PUBLIC RELATIONS BUREAU, MEDICAL SOCIETY OF THE STATE OF NEW YORK

First incubator patent was issued December 27, 1870, to Jacob and Henry Graves of Boston, Mass.

"It is better to be fat than dead," said Carl Malmberg in his book called "Diet and Die." He cites instances of well-known persons who have food-fadded themselves into their graves.

Warm weather and the increase of opportunities for recreation present certain dangers arising from overexertion at the outset, especially for adults. American life is characterized by too much haste in the activities of making a living—why carry this attitude over into the vacation days? Fathers should not attempt to keep pace with their young sons. A first-aid kit should always be taken on vacations. Immediate treatment should be given cuts and bruises. When wounds are caused by rusty nails or similar objects a child should be taken at once to a physician.

Nobody catches typhoid fever — he swallows it. Watch the sources of your water supply when you go camping.

Carelessness is the leading cause of death by drowning. Foolhardy "stunts," swimming in water which is too deep, trying to "show-off" contribute to the death toll. It is easy to learn to swim, everyone should know how.

There is no such thing as racial superiority, each type runs the gamut from idiots to geniuses and from criminals to philanthropists, according to Prof. Earnest A. Hooten, of Harvard University.

DR. FOSTER KENNEDY SAID:

Shakespeare was not a psychoanalyst. George Moore and Thomas Hardy were not psychoanalysts, but I venture to say that their understanding may be better than our knowledge.

Do identical twins think the same thoughts at the same time? Not necessarily, but they have identical patterns of brain activity. Electrograms of the brains of eighteen sets of identical twins proved this to Dr. Hallowell Davis and Dr. Pauline A. Davis of Harvard Medical School.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22301

PRESENTATION OF CASE

First Admission. A thirty year old Canadian entered complaining of weakness and shortness of breath.

Thirteen years before admission he was turned down by the Army for a "leaky heart valve". He noticed no symptoms at that time although he had always been tired. Since then, however, he had noticed irregularity of his heart after a hard day's work or a hard night's drinking. He continued at hard manual work and enjoyed swimming. Thirteen months before admission, after a drinking bout, he had a sensation of substernal discomfort with a rapid irregular heart. He could not get his breath and felt weak. He entered a hospital for one week and then remained at home in bed for three months, during which time he was slightly orthopneic. At the end of this period he got up for a walk but became markedly dyspneic and developed a cough which was productive of a cupful of blood and, during the next few days, blood streaked sputum. He was forced to sleep in a chair during the next month. Eight months before admission he developed a pleural pain in the right chest and since then had had it intermittently, often aggravated by colds. He had been on digitalis off and on. A few months later he had an acute attack of apparent decompensation with nausea, vomiting and severe orthopnea and became very tired and exhausted. A physician treated him with digitalis and morphia. Since then he had lived a very restricted life.

His father and mother were living and well. Seven siblings were living and well. Eight had died, all before one year of age, of unknown causes.

His wife died seven years ago of pulmonary tuberculosis.

The past history is non-contributory. There was no history of rheumatic fever, chorea or sore throats. He had gonorrhea four times, the last attack two and a half years before admission.

Physical examination showed a well-developed and poorly nourished young man. His fundi showed slightly tortuous arteries and engorged pulsating veins. His tonsils were large but not inflamed. His heart was markedly enlarged and showed a heaving impulse. The left border of dulness was 10 centimeters from the midsternal line, about 5 centimeters outside the midclavicular line. The right border was 5 centimeters from the midsternal line. There were systolic thrills at the apex and base. In addition there was a rough blowing systolic murmur at the apex transmitted to the axilla and also an apical diastolic murmur. At the base there were to-and-fro murmurs, the systolic very rough and transmitted to the neck. P_2 was loud but both murmurs were heard in the pulmonary area. The rate was fairly irregular and at times there were numerous extrasystoles. The liver was felt two fingerbreadths below the right costal margin. The spleen was not felt. There were no petechiae. The chest was clear except for a right pleural friction rub. The blood pressure was 140/48.

The temperature was 96.5°, the pulse 60. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 4,700,000 with a hemoglobin of 60 per cent. The white cell count was 10,000, 67 per cent polymorphonuclears. A Hinton test was negative. An electrocardiogram showed auricular fibrillation, rate 60 to 70, and inverted T_2 and T_3.

He remained in the house for approximately two weeks, receiving digitalis, and was discharged to be followed in the Out Patient Department.

Second Admission, two years later.

Following discharge he remained in bed for two months and then did quite well on a very restricted régime, taking from 1½ to 4½ grains of digitalis daily. One week before admission he suddenly had a hemoptysis of five or six teaspoonfuls of dark red blood which was followed an hour later with more blood. Since then he had much dyspnea, orthopnea and palpitation. During the past few days he had a cold with a fever of 104°.

Physical examination showed the patient to be in slight respiratory distress. There were several small petechiae in both conjunctivae and a questionable splinter hemorrhage under one fingernail. The heart was enlarged. There was a presystolic thrill at the apex and a well-marked systolic thrill at the base transmitted up into the neck. There were also a well-marked mitral diastolic roll at the apex with a softer systolic blow and a very harsh systolic murmur over the aortic area with a softer diastolic blow. A_2 was absent. P_2 came through only occasionally and was then accentuated. There was a pistol shot sound and systolic murmur over the brachial arteries. The pulse was

Corrigan in type. The blood pressure was 130/50. The rhythm was absolutely irregular but showed no deficit. The lungs were clear. The spleen was easily felt two fingerbreadths below the left costal margin. The liver was not felt.

The temperature was 99.5°, the pulse 80. The respirations were 22.

Examination of the urine was negative. The blood showed a red cell count of 5,500,000, with a hemoglobin of 80 per cent. The white cell count was 6,100, 46 per cent polymorphonuclears, 35 per cent lymphocytes and 15 per cent mononuclears. Three blood cultures were negative.

While in the hospital no more petechiae appeared. On the fifth day the patient suddenly awakened at 3:00 a. m. with pain and numbness in the left arm below the elbow. Examination showed that the pulse on that side was weaker than on the right and there was a definite level about two inches above the hand on the wrist beyond which the hand was cold and clammy. After the application of heat, however, the pain was somewhat relieved and during the next few days became very much better. There was no further change in his condition and he was discharged two and a half weeks after admission.

Final Admission, two years later.

He did quite well on a very limited régime until one year before admission when he began having ankle edema and severe orthopnea. Six months before admission he returned to bed but could not sleep lying down. He led a bed and chair existence during this period but for the past three months his signs and symptoms increased in severity. There was, however, no nausea, vomiting, fever or pleural pain.

Physical examination showed a very sick, cyanotic, orthopneic man. No petechiae were seen. There were moist râles at both bases, especially at the right. The heart was enlarged to the right and to the left. There was slow fibrillation but no pulse deficit. The cardiac findings were similar to those of his previous admission. The heart was 4.5 centimeters outside the midclavicular line. The spleen was felt two fingerbreadths below the left costal margin. There was massive edema of the lower extremities and sacrum. During his stay in the hospital several examiners could not feel the spleen.

He was kept on digitalis but gradually went downhill, showing no evidence of bacterial endocarditis, and died three weeks after admission.

Differential Diagnosis

Dr. F. Dennette Adams: The history of this man's illness is typical of the slowly but definitely progressing case of rheumatic heart disease, with presenting symptoms lasting for five years, and one symptom, cardiac irregularity, covering a much longer period. Heart disease at seventeen is most likely of the rheumatic type. The absence in his past history of any of its usual etiologic factors does not exclude rheumatic heart disease, particularly if there is convincing evidence of the presence of this condition. The fact that he had been refused admission to the army because of a "leaky heart" cannot be disregarded. Periodic attacks of rapid heart occurring at this age are due usually to paroxysmal auricular tachycardia, auricular flutter, or paroxysmal auricular fibrillation. Since irregularity was noted by the patient, the disturbance in rhythm was due probably to premature beats or paroxysmal auricular fibrillation. Such attacks, especially the latter, are apt to be associated with fatigue, and to follow alcoholic excesses. Substernal discomfort always suggests coronary disease, but it also accompanies these sudden disturbances of rhythm.

The first serious episode of congestive failure occurred over a year prior to the initial admission and five years before death. It was precipitated by heavy drinking. Improvement was slow, and even after three months of bed rest the patient's first attempt at activity brought on dyspnea and hemoptysis. Frank hemoptysis, if due to rheumatic heart disease, usually indicates mitral stenosis. It may be a sign of active rheumatic infection. A fairly extensive pulmonary embolus arising from a thrombus in the right auricle could give rise to similar symptoms, but they would probably be accompanied by severe pain of pleuritic type and signs of acute collapse.

The sequence of events following the initial attack of failure is characteristic of the chronic rheumatic heart case. The man remained a cardiac invalid until his death five years later, episodes of complete incapacity alternating with periods of relative improvement; but there was never freedom from symptoms and his reserve steadily diminished. He had all of the cardinal signs: dyspnea, orthopnea, palpitation, and edema. The nausea and vomiting were doubtless due to congestion of the liver or stomach, possibly to excess of digitalis.

In contrast to the rheumatic case, the patient with syphilitic or arteriosclerotic heart disease, once failure has set in, shows a more rapid decline, and does not have so many periods of relative improvement. There is nothing in the history to suggest hypertensive, hyperthyroid, or congenital heart disease.

The fatigue experienced by this man during the earlier stages figures more prominently than is usual for the organic heart case. Characteristically, the patient with organic heart disease complains of general fatigue in association with failure—not earlier. Not so with the functional

cardiac or the effort syndrome case; here the patient is always tired.

The alleged pleural pain in the right chest is not easy to explain. It is seen recurring with the ordinary head cold or upper respiratory infection but not commonly. It does not occur with passive congestion of the lungs, which, because of associated cough, is often wrongly interpreted as a "cold" or bronchitis. Pulmonary embolism can produce pleural pain, but this is acute, not chronic, pain.

The report of the cardiac findings on the first admission is somewhat confusing. There was apparent enlargement of both sides of the heart. A systolic thrill at the apex is not common. One is justified in questioning the correctness of the observer's timing and wondering whether this thrill might not have been of the presystolic variety. The character and timing of the apical diastolic murmur might also have been noted. This should not be difficult with a heart rate of 60, although it might be impossible if the heart were rapid. It is unfortunate that there is no mention made of the character of the first sound. A sharp, snapping first sound at the apex is a valuable sign of mitral stenosis.

Despite the absence of these important particulars of information, it seems to me that what evidence is presented regarding apical signs points to the presence of mitral stenosis and insufficiency.

A basal systolic thrill is almost pathognomonic of aortic stenosis. The rough systolic murmur at the base is further evidence of this lesion, and the basal diastolic murmur indicates aortic insufficiency. Aortic murmurs, especially if loud, are often heard in the pulmonic area, so their presence in this region is not necessarily indicative of pulmonic valve involvement.

The loud P_2 is explainable on the basis of increased pulmonic pressure due to delay in the left side of the heart. I do not know why the P_2 should have failed to come through with all beats. Auricular fibrillation with a rapid rate and many feeble beats might account for it. This patient, however, had a slow rate and probably, even if fibrillating, was not having many weak beats. No mention is made of a pulse deficit.

The aortic second sound is not mentioned. It may have been absent because of fixation or retraction of valve leaflets. The low diastolic blood pressure and relatively high pulse pressure are added indications of aortic insufficiency. With marked aortic stenosis the pulse pressure is usually small, the diastolic apt to be normal. So, if stenosis was present, as it must have been in this case, it could not have been very marked. The irregularity of rhythm was apparently wrongly interpreted on physical examination; the electrocardiogram showed fibrillation. It is not always easy to distinguish by physical examination between the irregularity due to frequent premature beats and that of auricular fibrillation. Passive congestion of the liver probably accounts for the palpability of its edge.

The laboratory findings contributed nothing of importance. The inversion of the T_2 and T_3 waves in the electrocardiogram could best be accounted for by digitalis, if the patient had been getting large doses, or by right ventricular hypertrophy. Fluid in the pericardial sac is a less likely, but a possible explanation. There is no mention of right or left axis deviation, both sides of the heart probably being hypertrophied—another bit of evidence in favor of a combination of mitral and aortic valve involvement. With mitral stenosis, P waves are usually increased, but this patient was fibrillating so he had no definite P waves.

At the time of the second admission the patient showed petechial spots in the conjunctivae, and a questionable splinter hemorrhage under one fingernail. In a known cardiac case these would suggest subacute bacterial endocarditis, but their presence in this man is counterbalanced by the absence of much fever and of anemia. Subacute bacterial endocarditis shows rises of temperature greater than the 99.5° given on this chart. As a matter of fact the probability of this being a rectal reading is suggested by the patient's dyspnea, and 99.5° by rectum would be considered normal. It is not possible, then, to account for these petechiae.

Three negative blood cultures do not exclude subacute bacterial endocarditis. Often many more are taken before a growth is obtained.

In this report of the second admission we find more conclusive evidence of mitral stenosis in the presystolic thrill at the apex and the diastolic rolling murmur. The pistol shot sound over the brachial arteries and the Corrigan pulse are corroborative evidence of the presence of aortic insufficiency. It is surprising that a Corrigan pulse should have been felt with the pulse pressure of 80. Usually a wider spread, or at least a much lower diastolic pressure is required before this phenomenon can be observed.

Why the spleen should have been enlarged on the second admission and the liver no longer palpable is inexplicable. If due to congestion one would expect the liver to be still enlarged, not to have receded. Embolus to the spleen is a possibility, especially in view of what happened to the arm, but we lack the history of pain in the left side characteristically experienced at the onset of splenic embolism.

The episode of pain, numbness, and circulatory change in the arm was undoubtedly due to embolism. There were two possible sources of embolus: first, thrombus in the left auricle;

second, but much less likely, vegetation breaking off from an active lesion on the aortic or mitral valve.

DR. BENJAMIN CASTLEMAN: It would have to be quite a large embolus from a lesion of subacute bacterial endocarditis.

DR. ADAMS: Yes. I do not believe it was from such a source. Emboli of bacterial endocarditis disease are smaller.

Two years later the man returned again, reporting that he had been doing quite well for a year following his last hospital visit.

It is surprising how long some of these advanced rheumatic heart cases live. Judging from the report of his condition at the previous admission, one would certainly not have given him two more years of life. Once congestive failure had set in the syphilitic or arteriosclerotic case would rarely last this long. But the rheumatic case often does.

On this last admission the patient was much more gravely ill than heretofore, all cardiac reserve having apparently been exhausted. Pulmonary and peripheral edema were present. The impalpability of the liver at this time provokes speculation: why should it not be palpable now, with this degree of congestive failure, when four years earlier it *was* palpable? The palpability of the spleen was questionable.

In recapitulation, then, the history and course of the disease are typical of rheumatic heart disease with congestive failure. The physical findings point toward mitral and aortic regurgitation and stenosis. Terminally, there was chronic passive congestion sufficient to cause, in addition to peripheral edema, possibly hydrothorax and hydropericardium. Autopsy probably showed a thrombus in the left auricle, possibly in the right. We have only one urine report, that obtained on the first admission. There should have been passive congestion in the kidneys and, of course, in the lungs and other organs. There is nothing to suggest subacute bacterial endocarditis or acute rheumatic infection.

CLINICAL DIAGNOSES

Rheumatic heart disease with mitral and aortic stenosis and regurgitation.
Myocardial failure.
Auricular fibrillation.

DR. F. DENNETTE ADAMS' DIAGNOSES

Rheumatic heart disease with aortic stenosis and insufficiency and mitral stenosis and insufficiency.
Hypertrophy and dilatation of the heart.
Generalized anasarca.
Generalized chronic passive congestion.
Chronic pleuritis, right?
Thrombus in the left auricle?
Thrombus in the right auricle?

ANATOMIC DIAGNOSES

Rheumatic heart disease.
Endocarditis, chronic rheumatic, with mitral and aortic stenosis and fibrosis of the ventricular endocardium.
Aortic stenosis, calcareous.
Cardiac hypertrophy.
Pulmonary infarct.
Rheumatic pneumonia?
Pulmonary arteritis, acute, ? rheumatic.
Congestion, chronic passive, of the spleen, liver and lungs.
Aortitis, rheumatic.
Pericarditis, acute fibrinous.
Pleuritis, acute fibrinous.
Peritonitis, acute fibrinous.
Pleuritis, chronic fibrous, right.

PATHOLOGIC DISCUSSION

DR. CASTLEMAN: The heart was quite large, weighing 775 grams. The hypertrophy was on both sides, and especially marked on the right. The right ventricular wall measured eight millimeters, which is three times the normal size, and with a wall of that thickness you would expect to find, of course, stenosis of the mitral valve. He had marked stenosis, thickening and calcification of the mitral and aortic valves. In addition to an old process, the aortic also showed acute deposits.

The cavities of the heart, on the other hand, did not show any mural thrombi at this time. That does not exclude the possibility that they may have been present two years before when he had embolic phenomena.

DR. ADAMS: I thought if one got there it usually stayed.

DR. CASTLEMAN: The whole thrombus breaks off sometimes. There was no evidence of subacute bacterial endocarditis, and no evidence of any disease on the right side of the heart. Sections of the heart showed several Aschoff bodies.

The lungs, on the other hand, were very interesting. They showed, of course, marked chronic passive congestion, and, in addition, numerous hemorrhagic areas scattered throughout both lungs, a condition that has been called rheumatic pneumonia. Histologically, the alveoli are atelectatic or filled with blood. Occasionally, they show organizing pneumonia. The arterioles throughout the lung showed marked intimal proliferation, a finding common in rheumatic heart disease with stenosis of the mitral valve. Some of the larger arterioles showed partial necrosis of their walls with deposits of fibrin and polymorphonuclear leukocytic infiltration. This necrosis which was characteristically in the media was found in both patent and obliterated vessels. There were also

one or two small hemorrhagic infarcts which I think were not embolic but a localized thrombosis in the lung.

A PHYSICIAN: Were those infarcts in the right lung or on both sides? It was on the right side that he had the pain two years previously.

DR. CASTLEMAN: The infarcts were on the left. He also had an acute pleuritis in both pleural cavities with just a small amount of fluid, a finding that one could not possibly detect clinically and, furthermore, an increased amount of fluid in the pericardial cavity. The aorta throughout showed what has been described as rheumatic aortitis, a condition that is sufficiently similar to syphilitic aortitis to be occasionally confused with it. There was focal destruction of the media and the vasa vasorum were often surrounded by lymphocytes. The liver showed marked chronic passive congestion. The kidneys showed slight passive congestion.

CASE 22302

PRESENTATION OF CASE

A thirty-nine year old Russian housewife was admitted complaining of a lump in the left side of the neck.

The patient had been well until four years ago when she began to have headache and malaise. She was pregnant at this time and, since she was found also to have high blood pressure, labor was induced at the end of the fourth month of pregnancy. Thereafter she became quite nervous and at monthly intervals had attacks of watery diarrhea lasting for two to three days. She became emotionally unstable and often cried at the slightest provocation. There was frequent palpitation associated with the spells of nervousness. About five months before entry a physician discovered a painless lump in the left side of her neck. Subsequently she noted that this became slightly larger transiently during her menstrual periods. A basal metabolic rate was said to be —9 and she was given some thyroid extract. This was discontinued, however, because of increase of nervousness. For three weeks before coming to the hospital she felt very weak, listless, and was unable to carry on her household tasks. The catamenia had begun at sixteen years and were always irregular. The menses recurred at intervals of two to three months and the flow was quite scanty. She had been married eighteen years and had three children. There were no miscarriages.

Physical examination showed a well-developed and nourished woman in no acute discomfort. The skin was normal but there was an abundant localized growth of hair in the lumbosacral region. There were no abnormal eye signs. Both lobes of the thyroid were palpable. The right was not increased in size or consistency. The left, however, was firm, smooth and enlarged to 3 by 4 by 2 centimeters. Immediately adjacent to it were a few firm, nontender, discrete nodes with a few large nodes lying beneath the left sternomastoid up to its cranial attachment. The heart was normal and the lungs clear. The blood pressure was 150/90. The remainder of the examination was essentially negative.

The temperature was 99°, the pulse 90. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 4,900,000, with a hemoglobin of 80 per cent. The white cell count was 12,000, 65 per cent polymorphonuclears. Two stool examinations were negative. A Hinton test was negative. The nonprotein nitrogen of the blood was 23 milligrams. A phenolsulphonephthalein test showed 70 per cent excretion of dye in two hours.

X-ray examination of the chest showed several areas of calcification in the right hilus and right lower lung field but the lung fields were otherwise clear. The trachea was in the midline and no mediastinal masses were seen. The heart and diaphragm were negative. A barium enema showed the colon to be negative. A gastrointestinal series showed no abnormality of the esophagus, stomach or duodenum.

On the third hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. MARSHALL K. BARTLETT: The problem here is the differential diagnosis of simultaneous enlargement of the left lobe of the thyroid and adjacent nodes in the neck which run up under the sternomastoid to its cranial attachment. In going over the record there is nothing that particularly helps me. The history of nervousness, diarrhea, emotional instability, and palpitation suggests hyperthyroidism. However, only one basal metabolic rate of —9 is given, and evidently those taking care of her were not sufficiently impressed to check it, so I think we will have to discard it. The statement that the size of the mass in the neck changed slightly during the menstrual period is a statement which patients frequently make. It does not mean very much to me and so far as I know is not diagnostic of any particular condition.

In the laboratory work the temperature of 99° and the white cell count of 12,000 are the only things that are even slightly abnormal. This perhaps would suggest the presence of a low grade inflammatory process, but that is about as much as I can deduce from them and that certainly is not too definite.

The question in my mind is whether the lump in the thyroid and the glands in the neck are parts of the same process or are two separate processes. Certainly the commonest cause for enlargement of the left lobe of the thyroid in a woman of thirty-nine would be an adenoma; but adenoma would not ordinarily be associated with glands in the neck. On the other hand the commonest cause for chronic enlargement of cervical glands in a woman of her age would be tuberculosis. I should say, however, that that would not account for the lump in the thyroid. Of course it is possible that there are two separate pathologic processes here. But I think it is very dangerous to assume that there are two if we can find something that will account for both of them.

What will account for both of them? Chronic thyroiditis is a possibility. The cases of chronic thyroiditis that I have seen have involved the thyroid more diffusely. The entire gland was involved, and I have not seen the regional nodes involved. I do not believe that that will explain it. An acute inflammatory process may involve one lobe and then subside to a chronic stage; but there is nothing in the history to suggest an acute onset. I do not believe that will do. Tuberculosis involving the thyroid is a possibility. It is very rare, however, and on that basis alone we prefer to exclude it. Actinomycosis is a possibility. It is exceedingly rare. I think we can rule out syphilis on the basis of the negative Hinton. So it seems to me that when we have gone through all the possibilities the diagnosis of adenoma is still the most likely thing to account for the swelling of the thyroid.

As I see it, the only way we can make an adenoma of the thyroid account for the enlargement of the cervical nodes is to assume that it has undergone malignant change and that she has metastases. If it has undergone malignant change, it is probably carcinoma. Lymphoblastoma would be much less common, I should say. Thirty-nine is rather young for carcinoma of the thyroid but of course it is a fairly rare condition anyway, and in that group its occurrence between forty and fifty is not uncommon. I think, considering the whole picture, that the best explanation is adenoma of the thyroid, nontoxic, which has undergone malignant change, and that the glands in the neck are metastatic.

DR. TRACY B. MALLORY: Are there any other suggestions?

DR. HORACE K. SOWLES: The x-ray says that there were some areas of calcification in the right hilus and in the left lower lung field. Presumably that was an old tuberculous process there and, if so, perhaps that increases the chance of the glands in the neck being tuberculous. I think, however, that Dr. Bartlett's assumption that it was fetal adenoma with malignant change is the best bet.

DR. AUBREY O. HAMPTON: There are small areas of calcification scattered over the base of the right lung and at the right lung root, just like an infantile infection. This is the swelling in the left side of the neck without calcification within it. I see no evidence of tuberculous glands in the neck.

DR. SOWLES: Then I think tuberculosis is probably a far cry. These glands were most likely metastatic disease from the thyroid.

DR. MALLORY: Dr. Hertz, have you anything to add?

DR. SAUL HERTZ: Lesions in the lateral aspect of the neck in association with swelling of the thyroid should always make one think of the possibility of aberrant thyroid tissue. A very large percentage of these cases that come to operation show a rather regular recurrence of papillary adenomata, and there is nothing inconsistent with the picture of papillary adenomata in this case.

PREOPERATIVE DIAGNOSIS

Carcinoma of the thyroid?

DR. MARSHALL K. BARTLETT'S DIAGNOSIS

Carcinoma of the thyroid with metastases to the regional lymph nodes.

PATHOLOGIC DIAGNOSIS

Papillary adenocarcinoma of the thyroid with metastases to the cervical lymph nodes.

PATHOLOGIC DISCUSSION

DR. MALLORY: This case was seen by several medical men at least one of whom thought it was probably lymphoma and wished to have a biopsy of one of the glands. Dr. Cope was asked to see it from a surgical point of view and he thought, since his diagnosis was the same as Dr. Bartlett's, a primary malignant tumor of the thyroid, that it was unwise to do a biopsy without being prepared to do something more. He made the usual thyroid incision and came down on a considerably enlarged thyroid and a long chain of glands running up to the base of the skull along the internal jugular vein. One of these was excised and showed a typical papillary adenocarcinoma. Following it he resected the left lobe of the thyroid and dissected out the glands as far as he could find any enlargement. He also carried the dissection down a slight way into the mediastinum and removed a portion of the thymus which turned out to be perfectly normal. The thyroid adenoma itself and all the nodes showed a papillary adenocarcinoma. There was one gland just to the other side of the midline which also showed the same picture

so that I am afraid it is improbable that all the growth was removed. On the other hand this particular kind of papillary tumor in the thyroid is relatively radiosensitive and the patient is now getting postoperative x-ray treatment which should provide a very considerable period of good health before recurrence appears.

DR. HORATIO ROGERS: I should say that with metastatic glands extending all the way to the cranial attachment of the sternomastoid the chance of cure, if the tumor was malignant, was slight anyway; so that perhaps the treatment of taking a biopsy to establish a diagnosis and then treating the whole thing by x-ray rather than surgery would have been perfectly proper.

DR. MALLORY: We were in considerable doubt ourselves as to what the wisest method of treatment was. Of all the various forms of malignant disease in the thyroid this is the lowest form of malignancy that definitely will metastasize, so that I think radical surgery has more point than it would with a frank carcinoma.

DR. HERTZ: Follow up cases from the thyroid clinic indicate that radical resection of a tumor plus x-ray treatment has advantages over x-ray treatment after biopsy.

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HEREDITY AND SPONTANEOUS CANCER

BIOLOGIC experimentation has been conducted for many years in an attempt to determine the rôle of heredity in susceptibility or resistance of animals to cancer. In a recent article, Little[1] has criticized the majority of this work on the grounds that homogenous or highly inbred strains were not used and, hence, that the genetic variables that were present vitiated the conclusions. Such homogenous strains of mice have been developed—some with a relatively high and others with a low incidence of spontaneous cancer of the breast. Experiments conducted with these strains have been reported and Little believes that certain conclusions are warranted.

It has been established that the incidence of spontaneous breast cancer in the first and second hybrid generations is largely dependent on the ancestral strain, but, as high incidence follows the maternal line, this type of inheritance is nonmendelian. The genetic factors involved in the incidence of lymphosarcoma are equally derived from the male and female line, a characteristic of mendelian inheritance. Blockage of the nipples (irritation) results in an increased incidence in high cancer stock, but has no effect in low cancer stock. Virginity and the absence of ovarian secretion (castration) retard breast development and, hence, reduce cancer incidence. Transplantation of ovaries of either high or low cancer stock into castrated females restores the normal incidence of breast cancer. By keeping the genetic factors constant and by varying the ovarian and mammary factors and vice versa, it has been shown that both the internal environment of the individual and the hereditary transmission of constitutional influences have a definite effect on the incidence of breast cancer.

Though accurate biologic experiments of this sort tend to render ineffectual any attempt to draw conclusions from statistics of human families, they do offer one reasonable approach to the study in the laboratory of the nature and cause of cancer.

REFERENCE

1. Little, C. C.: The Present Status of Our Knowledge of Heredity and Cancer. J. A. M. A. 106:2234 (June 27) 1936.

SILICOSIS AND TUBERCULOSIS

GRANITE dusts are still uncontrolled in most small granite cutting plants. Representatives of the Massachusetts Tuberculosis League, New Hampshire Tuberculosis Association and Vermont Tuberculosis Association, led by Dr. Frederick T. Lord, President of the League, and Mr. Manfred Bowditch, Director of the newly created Division of Occupational Hygiene of the State Department of Labor and Industries, paid a visit to the granite dust control demonstration at Quincy, Massachusetts. This research concerns control of granite dust in small granite works.

Aside from much experimentation with the devices of inventors the demonstration's chief value may be a study and grading of granite dust control devices now on the market. This data will presently be compiled by the Division of Occupational Hygiene and so made available to all concerned.

The above-mentioned agencies have assisted with the financing of this experiment as have the City of Quincy, Metropolitan Life Insurance Company, National Tuberculosis Association, Granite Cutters International Association of America, Liberty Mutual Insurance Company, American Mutual Liability Insurance Company, Employers' Liability Assurance Corporation, Ltd., and the United States Mutual Liability Insurance Company. It was done because while larger companies can afford dust control systems and may know which are efficient, these things were generally untrue of

small granite working establishments. The work was put into operation last May as an approved Emergency Relief Administration project. At the expiration of this agency the project was inactive for three months. On approval by the Works Progress Administration it is again active and now nearing completion.

Of interest in connection with the primitive measures in operation and under investigation is the growing appreciation of the importance of silicosis as an industrial problem, a disease entity and its relation to tuberculosis.

On page 143 of this issue, Dr. John B. Hawes, 2nd, emphasizes the three phases of the subject. This article is worthy of the attention of general practitioners, many of whom have not been made aware of the frequency of this disease or the importance of early diagnosis although much has been written about it.

He makes it perfectly plain that even though silicosis is caused by exposure to certain dusts, the inhalation of the fine particles of organic material does not produce this disease. If the rest of Dr. Hawes' paper is studied and the facts presented kept in mind, there will be fewer mistakes in diagnosis in dealing with certain pulmonary disorders.

STATEMENTS TO THE PRESS

RECENTLY all the Boston papers have given great publicity to an instance of alleged neglect by the ambulance service of the City of Cambridge. In the earliest reports it was stated that a poor man had called the police department to send an ambulance to take his daughter to the Cambridge City Hospital. Because of departmental rules the ambulance was not sent at once, but the night telephone operator got in touch with a doctor who went to see the patient. Immediately after his visit to the patient he sent her to the hospital where she promptly died. The cause of death was stated to be "double pneumonia" and the doctor was alleged to have stated that *"If the ambulance had gone at once the child might have been saved."*

Whether a municipality should be expected to provide immediate ambulance service, at the call of any citizen, to respond to cases of illness as distinguished from accidents would seem to be a very debatable question. It would not be unreasonable to assume that many more patients might be injured by moving them before they are seen by an experienced doctor than would be injured by a reasonable wait for a physician.

In this instance it is difficult to conceive how transportation to the hospital a few minutes or even hours earlier could have made any difference. It would be of great interest to know on what grounds the doctor made his alleged statement (if he ever made it).

Such statements stir up a great deal of heat and very seldom accomplish much good. Would it not be a very important, useful, and public-spirited service for each local public relations committee of the Massachusetts Medical Society to investigate all such newspaper reports promptly on their own initiative and make a report in the form of a letter to the newspapers and an item in the *Journal?* In some cases constructive suggestions might be made that would do much to raise the standing of the profession beyond its already admittedly high level.

See "A Warning to Physicians," page 170.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

BLAND, EDWARD F. B.S., M.D. University of Virginia Department of Medicine 1927. Assistant in Medicine, Massachusetts General Hospital and Harvard University Medical School. Assistant Visiting Physician, House of the Good Samaritan, Boston. Address: Massachusetts General Hospital, Boston, Mass. Associated with him is

WHITE, JAMES C. A.B., M.D. Harvard University Medical School 1923. F.A.C.S. Assistant Professor of Surgery, Harvard University Medical School. Assistant Visiting Surgeon, Massachusetts General Hospital. Address: Massachusetts General Hospital, Boston, Mass. Their subject is Relief of Severe Angina Pectoris in Young People with Rheumatic Heart Disease: With Remarks on an Atypical Anginal Syndrome. Page 139.

HAWES, JOHN B. 2ND. A.B., M.D. Harvard University Medical School 1903. President, Boston Tuberculosis Association 1922-. Secretary, State Tuberculosis Commission 1907-1918. Consultant, Diseases of Lungs, U. S. Veterans' Bureau, New England District 1918-1926. Director, National Tuberculosis Association and Massachusetts Tuberculosis League. His subject is Silicosis. Page 143. Address: 330 Dartmouth Street, Boston, Mass.

TILLOTSON, KENNETH J. M.Sc., M.D. University of Vermont College of Medicine 1921. Psychiatrist-in-Chief, McLean Hospital, Waverley. Psychiatrist, Massachusetts General Hospital. Assistant Psychiatrist in the Department of Hygiene, Harvard University. Instructor in Psychiatry, Harvard University Medical School. His subject is Psychobiology in General Medicine. Page 146. Address: McLean Hospital, Waverley, Mass.

ROBINSON, J. MAURICE. A.B., M.D. University of California Medical School 1930. Resident Radiologist, Massachusetts General Hospital. Formerly, Assistant in Medicine, University of California Medical School. Address: Massachusetts General Hospital, Boston, Mass. Associated with him is

SPENCER, JACK. M.D. University of Virginia Department of Medicine 1931. Roentgenologist, Palmer Memorial Hospital. Assistant Roentgenologist, Collis P. Huntington Memorial Hospital. Research Fellow in Medicine, Harvard University Medical School. Address: 695 Huntington Avenue, Boston, Mass. Their subject is Roentgen Therapy of Acute Postoperative Parotitis. Page 150.

DAYTON, NEIL A. M.D. Ohio State University College of Homeopathic Medicine 1915. Director of Statistics and Research, Massachusetts State Department of Mental Diseases, Boston, Mass. Instructor in Psychiatry, Tufts College Medical School. His subject is Marriage and Mental Disease. Page 153. Address: State House, Room 167, Boston, Mass.

MISCELLANY

A WARNING TO PHYSICIANS

There is said to be on his way to Massachusetts a young man twenty-two to twenty-four years of age, five feet, ten inches tall, weight 150 lbs., dark brown hair. This individual consults physicians for fictitious ailments usually sore throat and "cold on the chest," etc. He pays for the examination with a twenty dollar note which will be found to be counterfeit. He is said to be American with pleasing personality and acts in a manner to imply that he is a resident of the district in which the doctor resides.

Any information should be transmitted immediately to the United States Secret Service, Boston, Massachusetts, telephone Liberty 5600, attention of Agent McDermott.

TO PRESIDENTS AND SECRETARIES OF STATE ASSOCIATIONS AND DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION

LAYMEN LOOK TO MEDICAL ORGANIZATION TO CORRECT UNETHICAL PRACTICES

A public official, in conference upon a matter of medical economics recently, held that the plan of medical organization was weak in that the standards of ethics in county societies vary with the level required by the membership of each local unit. This, he added, cannot readily be corrected so long as the local members are indifferent to or approve of unethical practices. He suggested that if medical organization cannot or will not correct this defect and apply its efforts to the maintenance of desirable standards, it might better place itself under the supervision of The Better Business Bureau, Chamber of Commerce, or some similar group.

Excessive charges for medical services rendered to those of meager income is the most troublesome and inexcusable example of unfair economic practice. It is admitted that patients may be at fault in not making their financial conditions known, and the average fee may be obviously excessive for a patient of very limited finances. Some physicians endeavor to justify excessive fees charged those of very low income on the basis of charity service rendered others. It is plain that this position is not tenable. Moreover, investigation generally reveals that charity does not flow in any greater proportion from the hands of those who most often use this excuse for unjustifiable overcharge. The use of unfair collection methods for the exaction of fees known to be excessive must be recognized as a "racket". Laymen have questioned the disproportionate number of surgical procedures and amount of service rendered by certain physicians to those on medical relief. Thoughtless physicians seem to assume that transactions between the physician and his patient are governed only by "laissez faire". On the contrary the physician, in the system of graduated fees, accepts responsibility to the profession, to treat with fairness the individual who is admittedly unable to judge his needs for service or fix the compensation therefor.

That which makes the individual ethical and fair, without conscious deliberation, lives in the fibre of that individual and, viewed from a moral, intellectual, or spiritual approach, is to some degree an unteachable quality. The interests of the whole group, and of the public as well as those of the individual, make it necessary that certain ethical standards be set up, rules of behavior defined, and certain stringencies of group requirements imposed. These can be taught, and should assist the individual to that form of self-discovery by which he may see himself in his relation to fellow-members of his profession and the public which he serves. The Principles of Medical Ethics contain definite economic implications, as pointed out by the Bureau of Medical Economics in "Economics and the Ethics of Medicine".

The conduct of the individual in the economics of medicine is rightfully of interest to fellow-physicians. The attitude of county medical societies toward unethical conduct and unfair economic practice is a matter of interest to other Component Societies, to the State Association, and to the American Medical Association. The responsibility of each is clear. In the politico-social organization of government, the acts of individuals or small groups may unfavorably affect national attitudes.

The attention of the membership of component societies should be directed to the amendment to the By-Laws of the Association, which extends the power of the Judicial Council in matters of fellowship and medical ethics so that it "shall have authority . . . to request the President to appoint investigating juries to which it may refer complaints or evidence

of unethical conduct which in its judgment are of greater than local concern. Such investigating juries, if probable cause for action be shown, shall report with formal charges to the President who shall appoint a Prosecutor who, in the name and on behalf of the American Medical Association, shall prosecute the charges against the accused before the Judicial Council. The Council shall have the power to acquit, admonish, suspend or expel the accused." The language and purpose of the action are clear. Organized medicine can fix ethical standards and insist upon their observance by all its members.

Most physicians are guided by high ethical principles. To one who is responsive to the best traditions of medicine and to the nobility of character and sincerity of purpose which have created its ideals, the reflection of unethical conduct upon the profession is humiliating and intolerably offensive.

COMMITTEE ON LEGISLATIVE ACTIVITIES
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J. H. J. Upham, M.D.,
R. L. Sensenich, M.D., Secretary.
By—R. L. SENSENICH.

203 J. M. S. Building,
South Bend, Indiana,
June 20, 1936.

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MAY, 1936

Disease	May, 1936	May, 1935	5 Yr. Average*
Anterior Poliomyelitis	16	3	3
Chickenpox	877	1129	1058
Diphtheria	26	38	91
Dog Bite	1237	1316	706
Epidemic Cerebrospinal Meningitis	27	10	7
German Measles	1043	9786	2149
Gonorrhea	441	524	519
Lobar Pneumonia	423	428	350
Measles	6104	1751	3003
Mumps	1889	674	812
Scarlet Fever	924	980	1402
Syphilis	446	399	378
Tuberculosis, Pulmonary	352	334	346
Tuberculosis, Other Forms	36	49	50
Typhoid Fever	9	15	13
Undulant Fever	4	3	2
Whooping Cough	331	504	794

*Based on the figures for the preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Adams, 1; Chelsea, 1; Colrain, 1; Greenfield, 1; Southboro, 10; Winthrop, 1; Worcester, 1; total, 16.

Diphtheria was reported from Boston, 8; Cambridge, 1; Chelsea, 2; Fall River, 2; Lowell, 3; Randolph, 1; Revere, 3; Shirley, 1; Somerville, 1; Tewksbury State Infirmary, 1; Westford, 1; Worcester, 2; total, 26.

Dysentery, bacillary was reported from Attleboro, 2; New Bedford, 1; total, 3.

Epidemic cerebrospinal meningitis was reported from Belmont, 1; Boston, 13; Brockton, 1; Cambridge, 1; Chelsea, 1; Hull, 1; Leominster, 1; Lynn, 1; Marblehead, 1; Medfield, 1; Quincy, 1; Somerville, 1; Stoneham, 1; Westfield, 1; Winthrop, 1; total, 27.

Malaria was reported from Boston, 1.

Septic sore throat was reported from Amesbury, 1; Beverly, 1; Boston, 4; Cambridge, 2; Fall River, 1; Gardner, 5; New Bedford, 1; Watertown, 1; Worcester, 1; total, 17.

Trachoma was reported from Cambridge, 1.

Typhoid fever was reported from Boston, 2; Cambridge, 1; Lawrence, 1; New Bedford, 1; Norwood, 1; West Springfield, 1; Winchester, 1; Worcester, 1; total, 9.

Undulant fever was reported from North Adams, 1; Northampton, 1; Whitman (1935 case), 1; Wrentham, 1; total, 4.

The reporting of anterior poliomyelitis to date, in the State as a whole, shows nothing unusual.

Epidemic cerebrospinal meningitis had its highest reported May incidence since 1919.

Diphtheria with its lowest reported May morbidity is running somewhat below the record low figure of 1935.

The reported incidence of typhoid fever to date is 24 per cent lower than in 1935.

Pulmonary tuberculosis cases and deaths are being reported somewhat below last year's figures.

The reporting of mumps reached its highest May figure, while that of whooping cough was lower than for any May of which there is record.

Measles reached its highest May incidence since 1930.

The reported incidence of German measles although higher than usual for May was below 1935.

The reporting of chickenpox, lobar pneumonia, and tuberculosis other forms showed nothing remarkable.

RESOLUTIONS UNANIMOUSLY ADOPTED BY THE AMERICAN MEMBERS OF THE INTERNATIONAL SOCIETY OF SURGERY*

This meeting was held at the call of the American National Committee of the International Society, consisting of Drs. Elliott Cutler, Boston, Chairman; Eugene Pool, New York, and Rudolph Matas, New Orleans (President of the International Society of Surgery), who submitted the resolutions as follows:

"Since it has come to the notice of the American Committee of the International Society of Surgery, and of the Fellows of the International Society in the United States, that a movement is on foot to es-

*At a meeting held with the annual session of the American Surgical Association at Chicago, on Friday, May 8, 1936.

tablish a new international organization, with headquarters at Geneva (Switzerland) which has for its alleged purpose the promotion and cultivation of the science of Surgery by the joint co-operation of the leading surgeons of the world, in the interests of common humanity: and,

Whereas, the identical purpose in its essential principles has been fulfilled for the last thirty-two years by the International Society of Surgery, a thoroughly representative world organization, exclusively devoted to the promotion and advancement of Surgery in all its co-operative international relations; and

Whereas, it has been reliably reported that this newly constituted organization has been represented as connected and supported by the Rockefeller Foundation, of New York; and

Whereas, on direct inquiry the Rockefeller Foundation denied any knowledge of or relationship to the so-called International College at Geneva; and

Whereas, this new enterprise is seemingly managed and controlled by a small group of self-constituted founders and promoters at Geneva; and

Whereas, this new enterprise has not originated in response to any known appeal or expressed need from any of the constituted or representative surgical societies of Europe or America;

Be It Hereby Resolved

That the American Fellows of the International Society, who constitute one of the largest units of that organization and who are here in large representative attendance at the annual meeting of the American Surgical Association, do now, and, in meeting assembled, emphatically protest against the creation of a new and self-constituted international organization or project that is calculated to injure the most vital interests of the International Society, to which they belong and owe allegiance; and in furtherance of this protest all the Fellows of the International Society in the United States are urged to withhold their endorsement, support or alignment with the so-called International College of Surgeons at Geneva, or its ramifications in the United States.

Until the true status and motives that underlie this new and self-constituted enterprise are fully determined in their relations and effect upon the welfare of the International Society, by the investigations of the American Committee, under the Chairmanship of Dr. Cutler."

The conclusions of this committee are to appear in due time in the *International Journal of Surgery*, the official organ of the International Society, published at Brussels.

SUPPLEMENTARY NOTE

Since the meeting at Chicago, the American Committee, including the President of the International Society, have seen no reason to change their views or the text of the resolutions unanimously adopted at that meeting. On the contrary, they are now more than ever confirmed in their belief that the self-constituted International College of Surgeons with alleged headquarters in Geneva and New York, has no justification for its existence and, much less, for its high-flung pretensions.

EDITOR'S NOTE: The resolutions noted above are of particular interest in view of the article, "The International College of Surgeons — Why?" which recently appeared in the *Journal of the American Medical Association* (June 20, 1936) under the heading of current comment.

RESOLUTION ADOPTED BY THE JOINT COMMITTEE ON HEALTH PROBLEMS IN EDUCATION OF THE NATIONAL EDUCATION ASSOCIATION AND THE AMERICAN MEDICAL ASSOCIATION

JUNE, 1936

Moved by Dr. Bauer, seconded by Dr. Leland:

Whereas, At the annual meeting of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association held at St. Louis, Mo., February 25, 1936, a presentation was made by Major Joel I. Connolly, of the Chicago Board of Health, relating to possible health hazards in apparently modern plumbing installations in public buildings, and

Whereas, It was manifest in the said presentation that plumbing fixtures which have been generally regarded as safe and sanitary in design may in fact constitute a real and serious health hazard by reason of the danger of back siphonage and contamination of water supply mains, and

Whereas, The probability exists that such apparently modern, safe and sanitary plumbing installations may exist in numerous school buildings in the United States and,

Whereas, The existence of such apparently safe, modern and sanitary plumbing installations and reliance upon them brings about a sense of false security, therefore, be it

Resolved, By the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association that this Committee apprehends the possibility of danger to the health of school children from apparently safe, modern and sanitary plumbing installations in school buildings, and be it further

Resolved, That the said Joint Committee earnestly recommends to all school boards and school executives that surveys be instituted by competent engineers to ascertain whether or not the danger of back siphonage and consequent pollution of water supply mains exist in plumbing installations within their jurisdictions, and that such surveys be followed by prompt corrective measures, and be it further

Resolved, That these resolutions be offered for publication to all journals dealing with public health, health education and general education.

CORRESPONDENCE

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Ill.,
June 30, 1936.

Managing Editor,
The New England Journal of Medicine.

In addition to the articles enumerated in our letter of May 29 the following have been accepted:

Campbell Products, Inc.
- Kephrine
- Kephrine Hydrochloride
  - Kephrine Hydrochloride Bandages
  - Kephrine Hydrochloride Gauze
  - Kephrine Hydrochloride Powder
  - Kephrine Hydrochloride Rectal Suppositories

Lederle Laboratories
- Allergenic Extracts—Lederle

Sharp & Dohme, Inc.
- Diphtheria Toxin for Schick Test Diluted Ready for Use—Mulford
- Diphtheria Toxin for Schick Test Control Diluted Ready for Use—Mulford
- Insulin—Mulford, 100 units, 10 cc.

The following articles have been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in N.N.R. (New and Nonofficial Remedies, 1935, p. 445):

Lederle Laboratories, Inc.
- Glycerinated Allergenic Extracts—Lederle

Truesdail Laboratories, Inc.
- Golden State Agar Agar

Yours sincerely,
PAUL NICHOLAS LEECH, *Secretary,*
Council on Pharmacy and Chemistry.

REPORTS OF MEETINGS

PETER BENT BRIGHAM HOSPITAL LECTURE

The last lecture in his series was given on May 25, 1936, by Dr. K. H. Giertz, Surgeon-in-Chief pro tempore in the Peter Bent Brigham Hospital on the subject of "The Development of Respiratory Apparatus in Thoracic Surgery".

Until the beginning of the present century, surgery on the chest was limited to operations for empyema and abscess of the lung, and rarely for repair of trauma to heart or lungs. In spite of the tremendous progress made in thoracic surgery in recent years, operations within the pleural cavity are not yet performed with the safety to be expected in other surgical procedures. One of the most notable accomplishments has been the successful approach to the problem of maintaining the respiratory function of the lungs in as nearly a physiological manner as possible while the pleural cavity is open.

The ventilating efficiency of the lung depends on an alternating contraction and expansion driving the air in and out. The mediastinal wall, a thin, flexible structure shared by both pleural cavities, yields readily to differences of pressure between the two sides. When both pleural cavities are open to atmospheric pressure, the lungs collapse from their own elasticity and cause a rapid death from asphyxia. One pleural cavity opened widely is almost as serious, for the mobile mediastinum is shifted to the sound side on inspiration and away from it on expiration, so that most of the increased pleural space gained in inspiration is lost by this flutter of the mediastinum, producing asphyxia. Adhesions involving the mediastinum tend to decrease this flutter. The smaller the hole in the chest wall, the less is the amount of air which moves in and out each time and the less the degree of asphyxia. Since the dangers from operative pneumothorax are so very great, the ability to prevent an asphyxial death from mechanical interference with ventilation is a prime requisite for successful thoracic surgery.

Animal experiments give complete confidence in the physiological sufficiency of respiration achieved by mechanically forcing air in and out of the lungs. Artificial respiration by air under pressure is a very old procedure which for a time was held in disfavor because it was believed to produce acute pulmonary emphysema with the rupture of alveoli and laceration of the lungs. Not until 1897 did the surgeons begin to revive the practice of insufflation for their uses. In that year the Fell-O'Dwyer apparatus was in use in the Presbyterian Hospital in New York, and shortly thereafter Matas used a modification of it in New Orleans.

In Germany a different approach was made through the study of differential pressure chambers for the body and head. At first it was believed that a chamber for the body containing air at a pressure lower than atmospheric gave results superior to a head chamber or airtight mask providing air at an increased pressure, but the work of Giertz from 1914 to 1916 demonstrated that either method gave physiologically equal results and that the convenience and dependability of the apparatus available should decide the choice. The use of air under differential pressure removes the immediate symptoms of pneumothorax, such as cyanosis, but since the movements of the lung are still dependent on the movements of the bony thorax, it is impossible to secure pulmonary ventilation if the thorax is opened widely. Under this system the respiratory expansions are much reduced at best, and extraordinary care is required in doing a unilateral pleurotomy not to open the sound side, especially if there are no adhesions. The chief disadvantages of the differential pressure method are that the respiratory rate is slowed, that the thorax breathes in the inspiratory position, with the diaphragm low, and that the mediastinum is only relatively fixed. The treatment for the signs of respiratory distress consists in closing the chest, giving oxygen inhalation, and using rhythmical mechanical aids to respiration. The

minor circulation suffers under differential pressure by compression of the small vessels in the lung, which produces impaired lung circulation and an interference with the diastolic filling of the heart.

An interrupted air current introduced by intratracheal insufflation overcomes many of these difficulties and makes breathing more nearly normal. For satisfactory function one must have a properly located intratracheal tube closing the trachea efficiently and admitting under suitable pressure air saturated with water vapor. The tube is introduced by direct tracheoscopy, which is easily done by an expert. A distensible rubber bladder near the end of the tube is inflated to make an airtight fit; after two hours' use only a slight hoarseness is noticed. The chief advantage is that adequate ventilation is secured when the thoracic cavity is opened widely, and that no air is introduced into the stomach.

An inhalation apparatus developed in Sweden, the "spiropulsator", with a series of valves regulating the flow of gas in and out, enables the operator to adjust the pressure to suit the individual, to control the lengths of inspiration and expiration, and to measure exactly the volume of gas injected. The prompt uninterrupted exit of gas assured by this machine is very important.

Since the clinical success of the apparatus depends on the patient not straining or coughing, profound narcosis or complete local desensitization must be achieved before the tube is inserted. Nitrous oxide is acceptable as a nonirritating anesthetic, and because the spiropulsator permits the use of a low oxygen tension, sufficient of the gas to produce adequate narcosis can be given.

Morphine, atropine, and codeine are given preoperatively, and 2 per cent cocaine applied locally in the trachea and bronchi. If secretion or aspiration of infected material from the diseased part of the lung is feared, it is walled off by a gauze pack containing some local anesthetic. A mixture of 7.5 per cent oxygen and 92.5 per cent nitrous oxide is insufflated at a rate of twenty-five to thirty-five times a minute, each injection consisting of 500-600 cc. of gas warmed to 30° C. and saturated with water vapor. If the narcosis is not deep enough, evipal or a little ether may be given, for it is essential to have a complete suppression of reflexes, particularly those arising near the hilus of the lung.

The operation of lobectomy or pneumonectomy is performed through a posterior thoracic incision after resection of the fifth, sixth, and seventh ribs. Extensive adhesions are dissected with the diathermy knife, and bleeding points touched with diathermy. The pleura is drained through a catheter ending under water outside. Closing the bronchial stump is quite a problem, which has been solved by covering it over with fascia lata and burying it under the pleura in the mediastinum, or by invaginating the end, a difficult feat because of the stiff cartilage.

Before operation is undertaken, diagnosis must be made as accurately as possible by all available methods, the most useful of which are x-ray and bronchoscopy, with a biopsy if necessary.

Dr. Giertz concluded by expressing his appreciation of American advances in the technique of thoracic surgery.

Dr. Elliott C. Cutler closed the meeting after paying tribute to Dr. Giertz as an investigator and teacher of whom the Swedish people may justly feel proud.

HARVARD MEDICAL SOCIETY

The Harvard Medical Society met at the Peter Bent Brigham Hospital on April 28, 1936, with Dr. Merrill C. Sosman presiding.

The medical case was presented by Dr. William Clauser: A thirty-six year old Negress entered the hospital complaining of a feeling of fatigue throughout her adult life. She was first seen twenty-two years ago, when she complained of fatigue, lassitude, and back pain. No diagnosis was made at that time. Three years ago she was seen in the out-patient department because of menorrhagia and weight loss of ten pounds. Physical examination at that time was reported negative except for the fact that the right border dulness of the heart was found to be seven centimeters to the right of the midsternal line, and the left border dulness five centimeters to the left of this line. The Aschheim-Zondek test was positive. The red count was 4,500,000, and the hemoglobin 75 per cent. An x-ray of the chest revealed an elevation of the left diaphragm.

Eight months before the present admission she began to experience the periodical occurrence of burning pain in the precordial area, which occasionally radiated to the left shoulder or to the right side of the chest. This pain often occurred while she was resting, and was not relieved or accentuated by lying down. Six weeks ago she was seen in the out-patient department, complaining of severe dyspnea, and precordial pain.

Physical examination on entry was essentially negative except for emaciation and the findings in the chest. Inspection of the chest revealed unequal excursion of the right and left sides, and a cardiac pulsation to the right of the sternum. The right chest was resonant to percussion, but the left was tympanitic below the third rib anteriorly, and there was a band of dulness 5 cm. wide at the level of the seventh rib posteriorly, which moved with respiration. Breath sounds were absent in the left chest below the level of the seventh rib, and borborygmi were audible in this area. The vital capacity was 2400 cc. Fluoroscopic examination showed the left diaphragm to be at the level of the fifth rib on inspiration, and at the second on expiration. There was no paralysis of the left diaphragm, since it did not move paradoxically. The heart and trachea moved laterally on inspiration and expiration. The electrocardiogram showed no shift of axis, during respiration, however, in spite of these motions.

The case was diagnosed as eventration of the diaphragm, although Dr. Sosman raised the question

whether this term should be applied to a high diaphragm unless diaphragmatic paralysis was also existent. Dr. Henry Christian commented upon the frequency of anemia of blood loss in patients with diaphragmatic herniae and eventration. He suggested that the vital capacity might contribute to her feeling of weakness, because of the lack of proper ventilation.

Dr. J. H. Marks remarked that diaphragmatic elevation on the right produced few symptoms, but that a similar elevation on the left caused dyspnea and weakness. Operations on such cases are of little value if there is paralysis of the diaphragm, since there is muscular atrophy, and the bowels push the weakened organ. In this case Dr. Marks felt that a plastic operation might be beneficial.

The surgical case was presented by Dr. R. L. Peterson. A sixteen-year old Italian boy began to experience pain in the left lower jaw five months previously, and was referred to a hospital by his dentist. There he was given x-ray treatments, and medicines. Six weeks before entry to the Peter Bent Brigham Hospital, a mass was excised from the left lower jaw, and x-ray treatments were given. In spite of these measures the pain became so severe, and there was such a foul taste in his mouth that he could not eat. He lost twenty-two pounds during the past four months. The family and past histories were negative. Physical examination on entry was negative except for a large, firm, painful mass involving the left lower jaw, and extending into the buccal cavity. There was no enlargement of the lymph nodes in the neck. X-ray examination showed involvement of the entire left mandible by a rarefying destructive process, with spicules of bone radiating perpendicularly to the axis of the bone. The diagnosis of primary osteogenic sarcoma was made.

Dr. Sosman stated that radiation therapy was of little value in the treatment of osteogenic sarcoma. Dr. Wolbach remarked that the mandible was an extremely rare location for such tumors. Dr. C. C. Simmons had seen the patient in consultation and had advised radical hemiresection of the jaw. No decision had as yet been made as to what form of therapy would be employed.

Dr. S. Burt Wolbach, Shattuck Professor of Pathology at the Harvard Medical School, presented the paper of the evening, speaking on "The Pathology of Vitamin Deficiencies." Dr. Wolbach regards each vitamin as being responsible for a particular chemical process in the body. If the body is deprived of a vitamin some vital process, or processes, are suspended. Each vitamin deficiency is a specific starvation, in which there is a primary break in some metabolic process. It is impossible to "starve" one part of the body without affecting the rest of the organism as a whole. Therefore there are secondary effects of vitamin deficiency, as for example the anemia often seen in scurvy.

The bodily reactions to deficiencies of the various vitamins were discussed in detail. Vitamin E, or the "anti-sterility" vitamin, has recently been isolated in pure form. In rats, its absence from the diet renders the rat sterile, causing testicular atrophy in the male, and preventing the development of the fetus in the female after implantation of the fertilized ovum.

The vitamin B complex is now known to be divisible into at least four different substances, each of which has some specific rôle in the maintenance of normal bodily function. The heat labile fraction is known as vitamin B_1, and is concerned with the metabolism of the axones and nerve cells of the ganglia, the spinal cord, and the brain. Deficiency of this substance causes polyneuritis or beriberi, but the mechanism of the pathogenesis of this disease is not understood. Pathologically it is characterized by a myelin sheath degeneration, and by definite changes in the Nissl granulations of the nerve cells. Restoration of the vitamin causes very rapid amelioration of symptoms. The heat stable fraction of the vitamin B complex has three components, each of which has a slightly different action in the animal body. Some fractions will prevent rat pellagra without affecting human pellagra, and vice versa. Pathologically pellagra is characterized by an engorgement of vessels, and an increased rate of growth of the epidermis with an increase in keratinization. There is also a myelin sheath degeneration, which is not relieved by administration of vitamin B_1.

Keratomalacia is a specific starvation of epithelial structures for vitamin A. Secretory epithelium undergoes a marked atrophy as a result of withdrawal of this substance, and becomes "physiologically nonviable" with a complete suppression of secretion. The cells of the various body surfaces lose their efficiency as covering epithelium, which excites repair in the basal layers, with marked proliferation. An "undermining process" occurs, with replacement of the normal squamous cells. There is a continuous desquamation of keratinized cells, which gives rise to the gross pathology of the disease. Accumulations of these desquamated cells may resemble abscesses. Great thickening of the epithelium of the cornea and the desquamation of keratinized cells irritating to the eye take place, and there is vascularization of the substantia propria. There is atrophy of the enamel-forming organ, and inclusions of cells of this organ are found in the thin dentine of the labial side of the tooth, and in the pulp cavity. The capillaries in the region of the enamel-forming organ show a selective permeability to calcium, and therefore calcareous concretions are formed.

Vitamin A deficiency in an immature rat causes a change in the epiphyseal line, which becomes similar to that of an adult animal. Restoration of the vitamin causes an "awakening" of the cartilage cells, and a new growth of bone.

If the vitamin is supplied after deficiency, there is immediate regeneration of the epithelial tissues. The keratinized material undergoes vacuolization, and there is leucocytic infiltration. The basal cells mul-

tiply in normal fashion, and there is restoration of the epithelial characteristics of the specific area. It is interesting to note that the metaplasia and vacuolar degeneration of repair in vitamin deficiency is the same process histologically which normally occurs in the genital tract of rodents during each estrus cycle.

Dietary deficiency of vitamin D produces the formerly common disease rickets. In this condition there is a disturbance in the normal growth processes in the epiphyseal cartilages. Normally there is a proliferation of the cartilage cells on the epiphyseal side of the "growth line," and a degeneration of the older cartilage cells on the diaphyseal side of the line. Blood vessels grow into the areas formerly occupied by these cells, and there is an accompanying ingrowth of osteoblastic cells, which lay down osteoid tissue. After the degeneration of the cartilage cells there is a calcification of the cartilaginous and osteoid matrices. In rickets there is an acceleration of cartilage growth, and the cartilage cells remain viable, preventing the ingrowth of blood vessels into the diaphyseal side of the epiphyseal line. There is no calcification of the cartilaginous matrix, and no osteoid matrix is laid down. As a result there is an irregular widening of the epiphyseal line. Restoration of vitamin D causes a resumption of the normal growth sequence within twenty-four hours; there is degeneration of the cartilage cells on the diaphyseal side of the epiphysis, an ingrowth of blood vessels, and calcification of the osteoid tissue already present.

Vitamin C deficiency (scurvy) causes a suppression in the formation and maintenance of intercellular substances. Although the fibroblasts, osteoblasts, and odontoblasts are active, they produce a fluid substance which is inadequate, and which does not solidify. As a result there is no deposition of collagen, osteoid, or dentine. Studies of wound healing in scorbutic animals have demonstrated that collagen does not form from predeposited fibrin. In such animals a wound is filled with blood clot in which there is abundant fibrin, but no collagen is laid down until ascorbic acid is supplied. Then fibroblastic cells can be found laying down collagen, which can be found only in close proximity to such cells.

In summary Dr. Wolbach stated that vitamin A was concerned with the maintenance of the normal structure of the epithelial tissues, that vitamin C was necessary for the production and sustenance of intercellular substances, and that vitamin D was essential for normal calcification of osteoid and cartilaginous matrices, and for the normal sequence of bone growth.

Dr. O. A. Bessey commented briefly on some chemical aspects of the rôle played by vitamin B in the body, and stated that choline might be considered as one of the vitamins, since it has been found to be one of the dietary essentials. It is necessary for the normal metabolism of fat.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JULY 27, 1936

Saturday, August 1—

*10 a. m. - 12 m. Staff Rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Reginald Fitz.

*Open to the medical profession.

August 24-29—Harvard University Tercentenary Celebration. See page 1166, issue of June 4.

September, 1936—First International Congress of Sanatoria and Private Nursing Homes. See page 803, issue of April 16.

September 7-10—International Union against Tuberculosis. See page 654, issue of March 12.

September 7-11—American Congress of Physical Therapy will meet at the Waldorf-Astoria, New York City. See page 52, issue of July 2.

September 14 and 15—Tercentenary Session of the Harvard Medical School. See page 1166, issue of June 4.

October 12-18—Third International Congress on Malaria. See page 1076, issue of May 21.

October 19-23—Clinical Congress of the American College of Surgeons. See page 180, issue of January 23.

October 19-31—1936 Graduate Fortnight of the New York Academy of Medicine. See page 1221, issue of June 11.

October 20-22—Academy of Physical Medicine, Annual Meeting, Hotel Statler, Boston.

October 20-23—The American Public Health Association. See page 1226, issue of June 11.

March 30 - April 2, 1937—First International Conference on Fever Therapy. Postponement notice. See page 52, issue of July 2.

April 21-24, 1937—American Society for Experimental Pathology. See page 1075, issue of May 21.

BOOK REVIEW

Cardiac Output and Arterial Hypertension. Sidney A. Gladstone. 56 pp. $1.00.

This small volume of four chapters represents a partial report of the author's work as the Richard and Ella Hunt Sutro Fellow in Cardiovascular Research at the Mount Sinai Hospital in New York City.

The first two chapters deal with critical investigations of certain details in the foreign-gas method for the determination of cardiac output in man and are concerned chiefly with errors introduced by alterations in the oxygen consumption and blood flow, recirculation of the foreign gas and changes in the total volume of the lung-bag system during the rebreathing.

In the third chapter is a report of studies in cardiac output by the author's method in normal individuals and those with arterial hypertension. The conclusion that the output is not changed in arterial hypertension is in agreement with that of other recent workers.

The final chapter is a presentation of a theory of the pathogenesis of hypertension in renal disease. This involves the assumption of a pressor substance in the blood stream capable of being formed and excreted by the kidney. Theoretical considerations and selected reports from the literature are brought forth to maintain the author's thesis. This theory is a very attractive one, but will require a great deal more evidence before it can gain general acceptance.